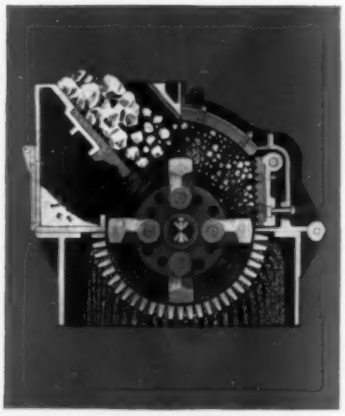
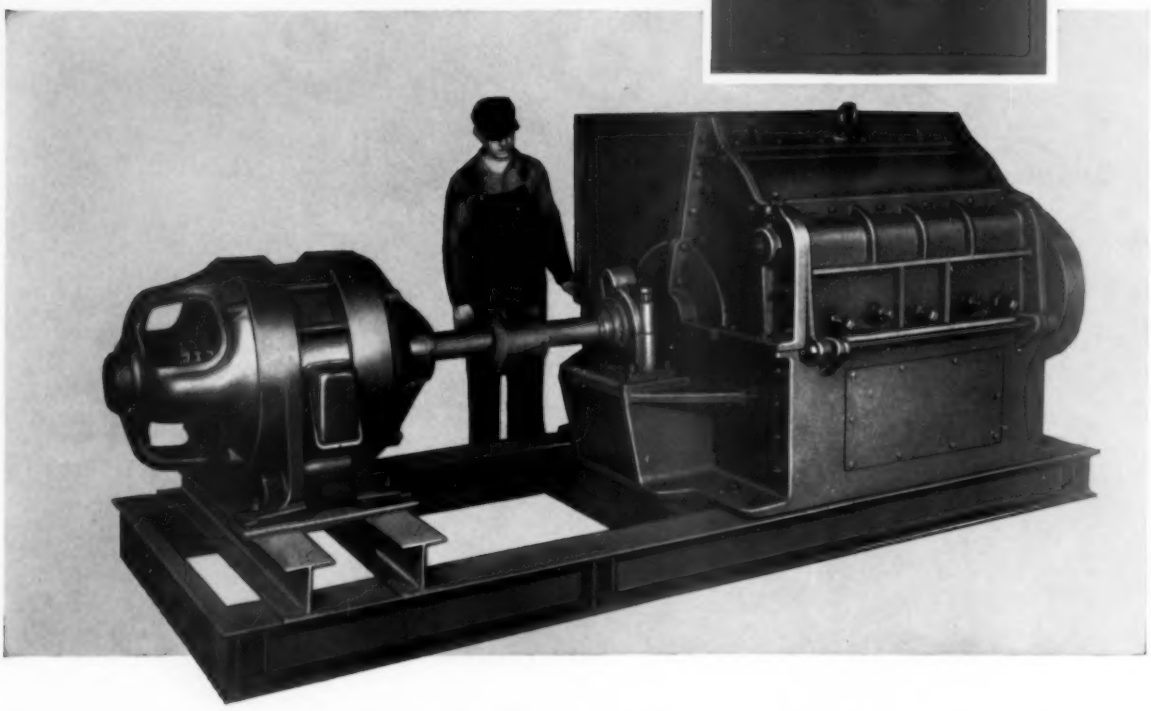
SEPTEMBER · 1959

ROCK PRODUCTS

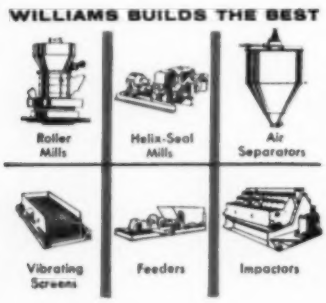
Annual
OPERATIONS IMPROVEMENT
Issue page 72

Complete size reduction... from start to finished product... in a single Williams Hammer Mill





Cut costs as much as 50% on production... up to 75% on equipment



In all normal crushing operations, a Williams heavy duty hammer mill can take most material and, *in a single pass*, reduce it to finished size! Production economies alone, in labor, power, maintenance, as well as stepped up output of better quality and more uniform products, will *cut costs up to 50%*.

Savings in original installations, *as high as 75%*, can also be expected. By making primary and secondary crushers unnecessary, a Williams hammer mill will eliminate all extra conveyors, drives, other equipment, special foundations and additional housing.

Williams hammer mills are built for daily rough and rugged service. Extra heavy manganese steel liners and breaker plates, oversize shafts, massive parts and reinforcements, all defy shock and wear, reduce downtime and replacements to nil.

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No other conveyor offers such rugged design and economy of operation in bulk materials handling. Call your nearby Link-Belt office for complete information. *Or write for Catalog 2779*, a new "Idea Book" for cutting costs with Link-Belt Pre-Bilt sectional belt conveyors.

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September 1959

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All B.F.Goodrich Grommet V belts are double-matched at no extra cost

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All B.F.Goodrich V belts now have 40% greater horsepower rating. This higher capacity rating was formerly found only in high capacity belts, but now costs *no more than former standard belts.* This means that lighter, more compact, and lower cost drives can now be used, because these B.F.Goodrich belts carry the horsepower needed for efficient drives using fewer belts at standard belt prices. And all B.F.Goodrich Grommet belts are double-matched.

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Traylor-made H & HB Jaw Crushers

Cutaway view below shows the advanced design of Traylor type HB Jaw Crusher.

56" x 72" Type HB Jaw Crusher installed in quarry of a steel mill.

See the Traylor Display at the Chem Show—Booth No. 495 New York Coliseum—Nov. 30 to Dec. 4

One of the many important features of the Traylor HB Jaw Crusher is the Traylor developed curved jaw plates employing the principal of the famous curved setting which have proved so successful in Traylor crushing machinery. The forged steel swing jaw shaft and the patented swing shaft suspension are two more of the features built into Traylor Jaw Crushers. For more information, write for Traylor Bulletin No. 5105.

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This new spherical roller bearing offers even higher capacity than SKF's original, self-aligning bearing—and meets the needs of today's faster, more productive machinery. In some cases, the increase in capacity is as much as 54%—corresponding to more than 4 times longer service life!

Here's how these improvements have been obtained:

1. Eliminating undercuts and integral flanges — helps provide space for larger rollers and longer effective contact between rollers and races.

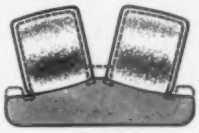

Fig. 1

Fig. 2

2. Using symmetrical rollers, unrestricted by flanges — ensures uniform load distribution over the roller length at all times, even under heavy thrust load.

3. Using an axially floating guide ring — provides effective roller guiding, and minimizes friction at roller ends.

Fig. 3

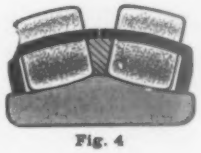

Fig. 4

4. Using a strong "window-type" cage for each row of rollers—helps ensure dependable operation over a full range of loads and speeds.

5. Placing a lubricant duct in the center of the outer ring—helps channel lubricants directly to the rollers and push contaminants away.

Fig. 5

For full details on this new high-capacity spherical roller bearing call the nearest SKF sales office or authorized SKF distributor listed in the yellow pages of the telephone book.

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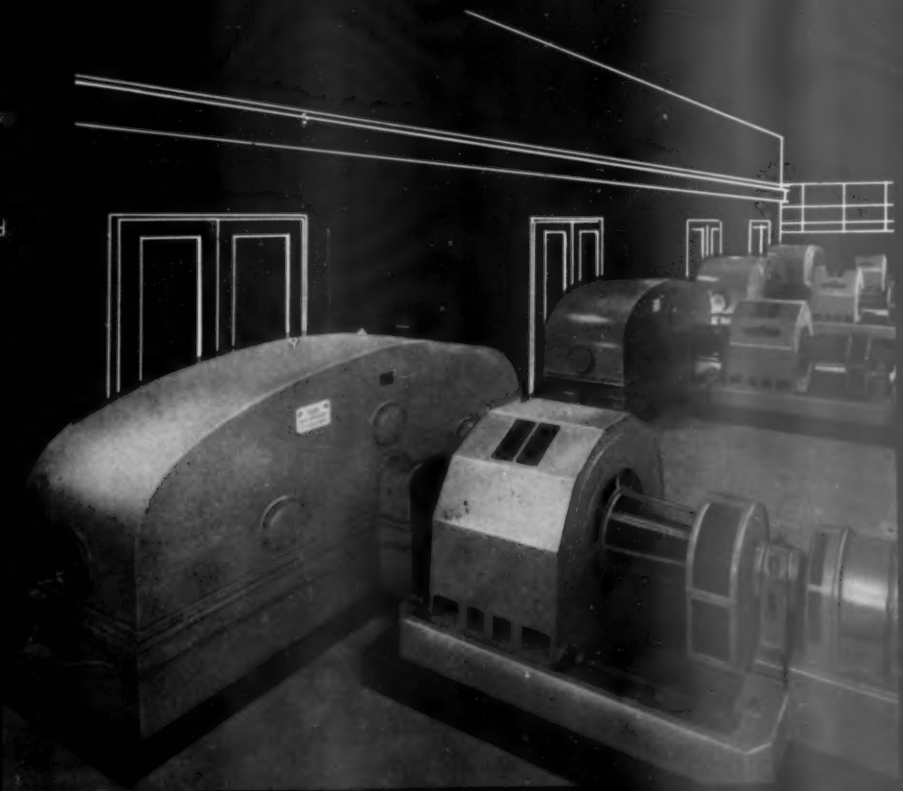

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WHAT'S HAPPENING

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

September, 1959

More sand will be used in the oilfields, if new methods for rejuvenating old wells are adopted. A recently developed process calls for a sand suspended in oil to be forced into oil wells. The extreme hydraulic pressure of the oil opens cracks and seams in the petroleum-bearing formation. Apparently the silica becomes lodged in these small openings and helps to keep them open while crude oil flows to the wall.

A machine that reads Russian has been invented. The National Bureau of Standards has come up with an electronic computer which can make a crude translation of scientific Russian into understandable English. Basis for the machine is its ability to store blocks of sentence structure and Russian idiom. Then when it compares this information with new materials fed to it, understandable translations are produced. Much more work must be done to smooth the jump from the infinite complexities of the Russian language to the erratic variables of the English language, and do it quickly and accurately.

Hard water makes lime at a Florida wood pulp mill. Buckeye Cellulose Corp. saves more than $50,000 a year by recovering practically all of its process lime from a water-softening system. With a hardness rating of 200 ppm., Buckeye's deep wells are a virtually inexhaustible supply of calcium carbonate. This is washed, centrifuged and calcined to make the 50 tons a day of lime used at the plant.

Missile range for rent. One of the very few areas in the world practical and available for testing rockets and missiles occurs in northern Canada. And one of the very best of these is the stretch of real estate stretching nearly 2,000 miles from Moosonee, Ont., to Cape Richards at the northernmost tip of Ellesmere Island. A proposal in The Financial Post suggested that the $60 million cost of developing this space-age laboratory be shared by other nations. They would have the opportunity to rent the launching and monitoring facilities for testing their own missile equipment without bearing the full cost of developing testing areas.

Fertilizer is obtained from cement kiln dust. That's the report from Finland where a cement mill sells its high potassium electrostatic precipitator dust. In this way it saves a difficult disposal problem, helps to control the buildup of alkali fume in recycled dust and gets some income for its trouble. A complex nuclear detecting and signaling device senses when the potassium content of the precipitator dust exceeds about 7 percent and diverts it to collecting bins. Otherwise, the dust is recycled to the feed end of the kilns.

There's no letup in the number of ingenious attempts to reduce the high costs of conventional building materials. Two Dutch immigrants into Australia have come up with a gypsum block which promises to give brick construction in that country a run for its money. A single cored block is about the size of nine bricks, weighs half as much and costs 15-percent less to install. In that country, natural stone is available in modular sizes which can compete with brick construction in local areas. Sandstone is accurately cut to standard size, packed and palleted for shipment. This procedure outmodes jobsite stone cutting and minimizes waste.

An electronic computer may replace the traffic cop in Toronto if present studies of computer-controlled systems become a reality. The computer in a central location would take traffic information sensed at a number of control points, compare it with stored information based on previous experience, interpret it and relay it to drivers through conventional traffic control signals. While the cost will probably be very high, the city hopes to realize savings through the better use of existing streets and by eliminating the need for costly superhighways in congested downtown areas.

Water seepage in drill holes can be prevented. Two radically different processes show promise for sealing drill holes in wet and porous formations. Most suitable for airswept holes is a gas sealing technique developed by Gulf Oil Corp. A commercially available gas is pumped under pressure into the porous zone. There it reacts and forms a dense precipitate which effectively seals the area when gas pressure is relieved. A Dutch method for wet holes involves the injection of a saturated water-glass solution. This is followed immediately by a calcium chloride or other salt solution which reacts with the silicate to form a gel. This tough gel prevents the flow of water through the sealed areas.

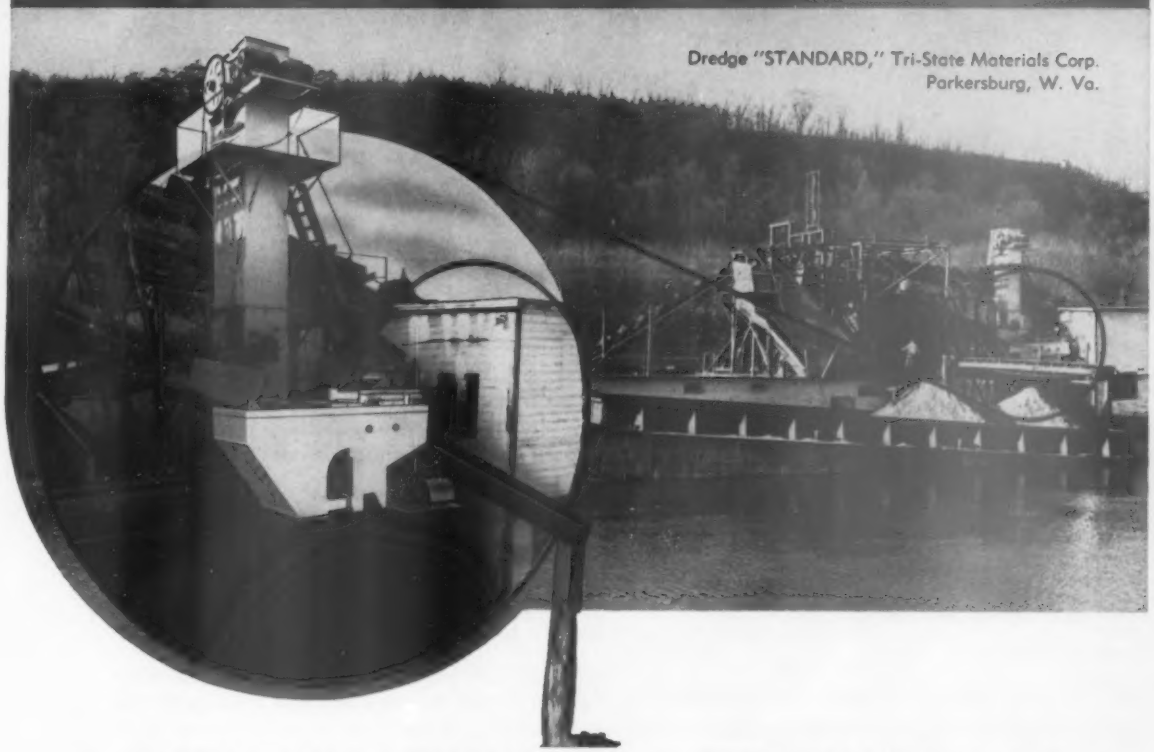
The depths of the earth may become a huge crucible for making industrial chemicals. This is the prediction of famed atomic scientist, Edward Teller. With the help of an underground atomic blast, an entire deposit of limestone could be converted to a mass of calcium carbide. Water introduced through well holes would generate acetylene, a basic industrial chemical. Sulphuric acid might be pumped out of wells in much the same way with a blast in a deposit of sulfur. Who can tell—we may yet be able to mine portland cement rather than to manufacture it so laboriously?

First monorail system in this hemisphere will be installed in Seattle. Monorail transportation has been a well-discussed novelty for a generation, but the only practical installations have been short loops. The Seattle Transit Commission apparently means business, for it has ordered a mile-long, $5 million system from the business district to the site of the city's 1961 exposition. After that, the line could become the first unit in a city-wide monorail mass-transportation network.

The editors

"...The most efficient gravel washer and trash separator yet developed"

SAYS OHIO RIVER SAND & GRAVEL CORP. AND TRI-STATE MATERIALS CORP.



Dredge "STANDARD," Tri-State Materials Corp.
Parkersburg, W. Va.

The OPERATING PERSONNEL & MANAGEMENT state:

"In our opinion, yours is the most efficient gravel washer and trash separator yet developed. It requires a minimum of space for installation, maintenance and operation, with the lowest maintenance and operating costs yet."

The FUEL PROCESS GRAVEL WASHER occupies a small space and can easily be installed on your unloading dock. Recent dock-side installations include: Bedford Nugent Sand Company, Evansville, Ind.; Ohio River Sand Company and Nugent Sand Company, both of Louisville, Ky. A recent dredge installation: Kanawha Sand Company, Parkersburg.

Our engineers are available to assist you in every possible manner. Write for full details so that you can also benefit from greater efficiency and lower production costs.

For most installations this unit washes out trash, coal and other extraneous material with water as the separating media—but heavy media can also be used.

FUEL PROCESS COMPANY

"D" at 10th AVE.··· SOUTH CHARLESTON··· WEST VIRGINIA

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EDITORIAL

by GEORGE C. LINDSAY

Investment is the key to survival

YOU CAN INVEST MONEY TO SAVE MONEY. But first, you'll have to know your costs of doing business—accurate costs. Once you know them, you can pinpoint the parts of your operation that you can improve to get the most return from your investment.

A machinery maker puts it this way: "The most costly machines in the world (costly to you) are the efficient new machines in your competitor's plant." With those machines, your competitor may improve his product, undersell you, or make more profit. He may do all three. Can you afford to let him?

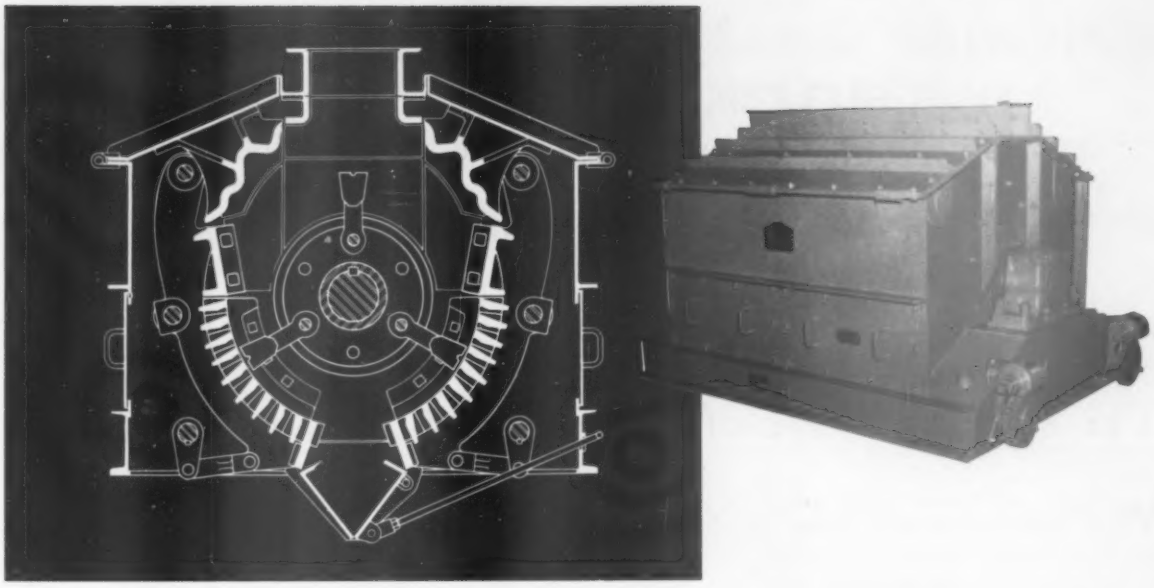
Everyone talks about efficiency. But not everyone keeps detailed records and cost data, which are needed to find out whether or not plants are efficient. Even among those who do, too few know where they can invest money in capital improvements to raise efficiency—especially where to spend money to get highest returns the quickest.

Our efficiency survey showed that 60 percent of aggregates producers keep some kind of detailed cost records. About a third of these used the records to figure where money could be spent to conserve labor or to step up capacity. But only ten percent attempted to spend their improvement money where the return on investment would be greatest.

An engineering analysis goes hand-in-glove with good cost records. Without it, even the best cost records lose effectiveness. Have you checked to see if every piece of machinery in your layout does the job it was planned for? Does it perform with the least amount of power, labor and investment per ton of output?

Until you find these invisible bottlenecks to good efficiency, there's not much you can do about them. Successful operators use engineering analyses to find the costly trouble spots, and to project remedies for them. They use them also to check operating efficiency of each piece of equipment in the flow diagram. Using the prescribed remedies, they can balance the operation to get the most out of it.

Invest money in this way and you'll boost your chances to compete pricewise, improve your product and make more profit. Don't spend the money, and you'll find your investment eroding away because of uncontrollable rising costs.



Here's how the Pennsylvania Reversible Hammermill will help lower your operating costs

As the feed enters the mill it is precrushed in the upper zone by being struck by the hammers in free air, driven against the breaker blocks, ricocheting and struck by hammers again. Only small pieces enter the lower crushing zone for final reduction before escaping through the cage bars. There's no dragging of hammers through oversize in the lower crushing zone. Thus wasteful fines are held to a minimum along with hammer wear and power requirement. The easily adjusted cages assure you a uniform product for the life of the hammers regardless of variance of the physical properties of the rock. The cage adjustment also permits you to wear the hammers much further, and, due to reversibility of the rotor, there is no manual turning of the hammers. Get the complete story of these crushers. Send for bulletin 1034. Pennsylvania Crusher Division, Bath Iron Works Corporation, West Chester, Penna.

Pennsylvania CRUSHERS

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ROCKY'S NOTES

by NATHAN C. ROCKWOOD

The state owns the sand and gravel

WE CAN NOW ANSWER THE QUESTION posed in the October 1958 issue on this page: "Whose gravel? Legal aspects of 'mineral rights.'" That article dealt with the case of a Michigan farmer who had purchased 40 acres of land ostensibly for pasture, which had reverted to the state for nonpayment of taxes. The state government had set up a Conservation Commission to deal in this kind of property—mostly cut-over forest land abandoned by the lumber companies after removal of marketable timber. At the same time the state reserved to itself all "mineral rights."

In spite of the fact that his deed contained such a restricting clause, the farmer subsequently sold some 54,000 cu. yd. of road gravel removed from this piece of property. The state authorities, upon knowing about it, claimed the $4,350 which had been received for the gravel. The farmer at first tried to make restitution, either in cash or gravel from some other part of his property. Then, upon having a lawyer examine his deed, he claimed that the mineral reservation clause did not include sand and gravel. We outlined his lawyer's argument in the October 1958 issue referred to above. It convinced the County Circuit Court, and the farmer won his case.

The state's attorney was not satisfied, and he appealed to the State Supreme Court. In his plea he said: "This case is of utmost importance, since it will decide not just the rights of the parties here before the court, but the rights of the state as contained in the mineral reservation in lands totaling approximately two million acres." The decision is interesting and important to all buyers and sellers of land to be used for production of mineral aggregates, since it adds one more interpretation of the "mineral rights" clause by a supreme court.

Reservation Clause: The farmer's deed included the following clause: "Saving and excepting out of this conveyance and always reserving unto the said State of Michigan, all mineral, coal, oil and gas, lying and being on, within or under the said lands hereby conveyed, with full and free liberty and power to the said State of Michigan, its duly authorized officers, representatives and assigns, and its lessees, agents, workmen, and all other persons by its or their authority or permission, whether already given or hereafter to be given, at any time and from time to time, to enter upon said lands and take all usual, necessary or convenient means for exploring, mining, working, piping, getting, laying up, storing, dressing, making merchantable, and taking away the said mineral, coal, oil and gas, pursuant to the provisions of Section 8 of Public Acts of 1909."

Sand, gravel and stone are not mentioned specifically. At that time, before the roadbuilding era started, these "minerals" were not generally regarded in the same class with coal and oil. Subsequently the law was amended and revised to include mention of sand, gravel and stone, and the farmer, at the time of his land purchase in 1938, was aware that these were included in the definition of "mineral rights." The farmer, therefore, based his case on the technicality that mineral rights to sand and gravel were not specifically defined and included in his deed, and on the general principle that since all this 40 acres was little more than sand, reservation of the right to remove sand and gravel would have left him with the purchase of nothing more than a hole in the ground.

Supreme court decision: The decision of the Michigan Supreme Court states the issue thus: 'This appeal arises out of a bill by plaintiffs, husband and wife, to quiet title to property deeded them by the Department of Conservation. The facts are not in dispute. The primary question for our determination is whether the word 'mineral' as employed in the deed before us includes within its meaning sand and gravel. The purchaser says it does not. The state (seller) says it does."

Please turn to page 138

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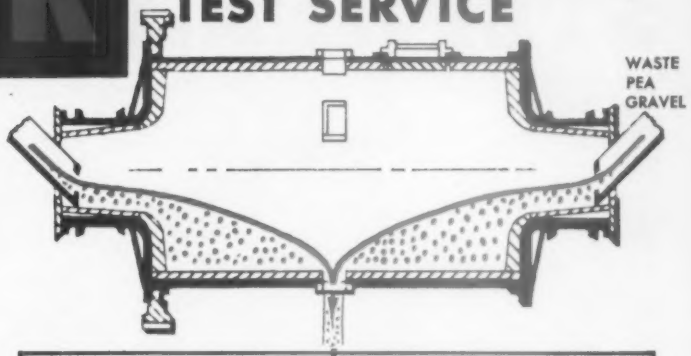
DENVER

SAND GRINDING TEST SERVICE



Before you invest in a grinding mill or auxiliary equipment to manufacture sand, BE SURE!

The first step to Profitable Specification Sand Production is an actual demonstration.

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Find out the exact size of mill you require, mill cost, power requirements, mill production and proper size of auxiliary equipment.

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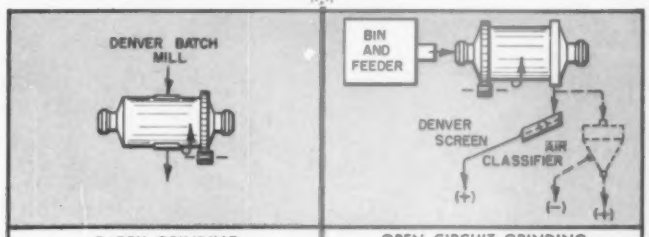
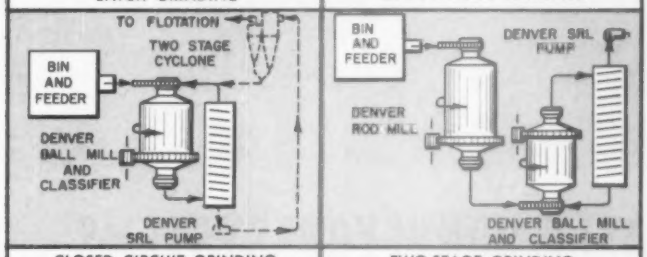
NO OBLIGATION!

Mill sizes (up to 10′ dia. by 20′ long) and type best suited for your grinding needs are described in Bulletin No. B2-B20.



BATCH GRINDING | OPEN CIRCUIT GRINDING



CLOSED CIRCUIT GRINDING | TWO-STAGE GRINDING

Denver Laboratory grinding test facilities include Ball Mill—wet or dry, grate or overflow discharge. Rod Mill—wet or dry, overflow or peripheral discharge. 2-stage grinding systems with mechanical classifier, wet cyclone, vibrating screen or air classification.

Denver Grinding Test Service determines grinding characteristics and mill capacities; also determines circulating loads, supplies data for sizing accessory equipment, determining power requirements and grindability indexes.

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TORONTO
185 Bay Street
Phone EMpire 3-8836

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802 Credit Foncier Bldg.
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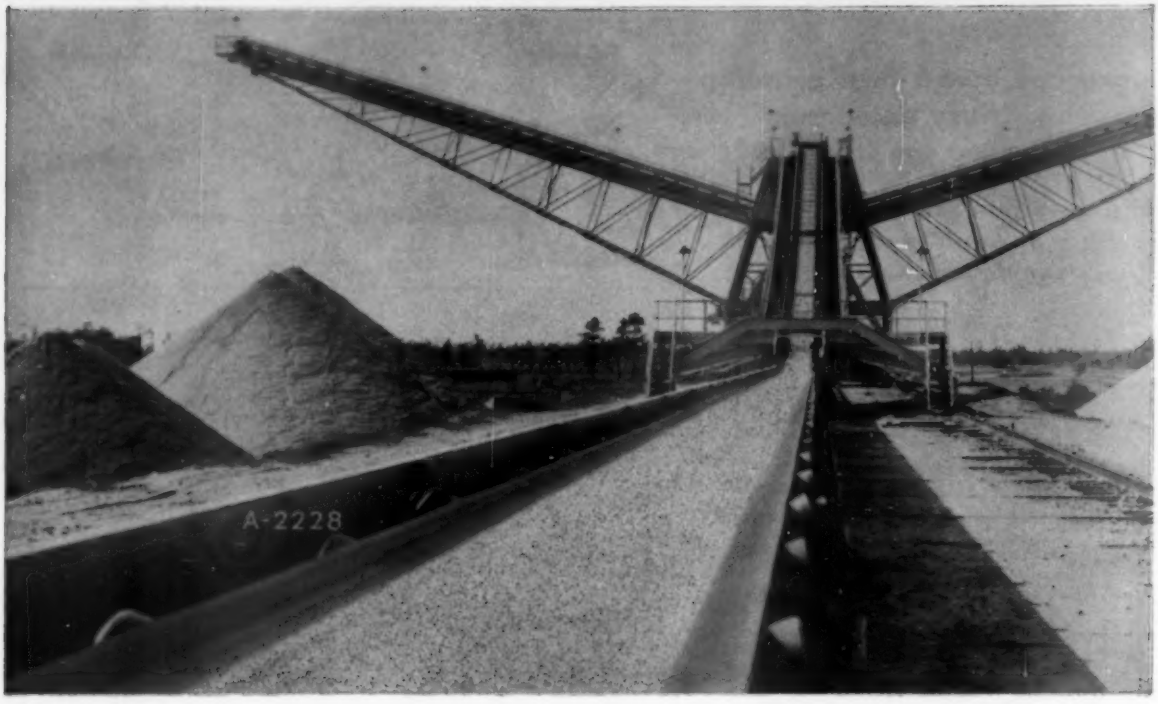


BELT CONVEYOR SYSTEMS...lower handling costs!

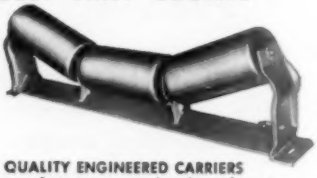
Nearly a half-century ago STEPHENS-ADAMSON engineered its first sand and gravel conveying system. Today, that system is not only performing efficiently but the company is a loyal S-A customer.

Since that first system was installed STEPHENS-ADAMSON engineers have engineered and built innumerable rock products handling systems — each calling for certain innovations, because as you know — every operator's handling problem is a little different. The final result with each new S-A installation is the same however . . . bulk materials are handled at the lowest cost per ton.

Profitable conveying of bulk materials over the belt is dependent on what's under the belt in quality-engineered conveyor components. S-A conveyor components contain features — (many of them patented) — found in no other conveyors on the market.

Write for bulletins 355 & 558 covering belt conveyor components.

IT'S WHAT'S UNDER THE BELT THAT COUNTS



QUALITY ENGINEERED CARRIERS
S-A manufactures a complete line of carriers, quality-engineered with features found in no other carrier regardless of price.

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Maximum belt training effect with minimum belt stretch and wear are provided with exclusive S-A CURVE CROWN design.

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WASHINGTON LETTER

by EDGAR POE

Anti-stream Pollution Federal aid

The Senate has before it a House-passed bill that would provide up to $100,000,000 a year for 10 years, and raise the ceiling on individual federal contributions in an accelerated program to clean up stream pollution.

Sponsored by Representative John A. Blatnik, Democrat of Minnesota, the bill is unlikely to be approved in the present form. Because of the financial condition of the Treasury Department, it would face a veto threat. While Congress was considering an accelerated anti-pollution program, the existing program authorized grants of up to $50,000,000 a year to help localities in their pollution problems.

End deadlock On Interstate Highway bill

Congressional leaders expressed confidence that there will be no slowdown of the Interstate Highway System construction program. Confidence came after the House Ways and Means Committee finally broke a deadlock and reported out for consideration a one cent increase in the Federal gasoline tax.

As reported, the additional one cent tax would be a temporary measure. It would run from September 1959 until July 1, 1966, a total of 62 months.

The Committee also agreed to recommend that one-half of the present 10 percent excise tax revenue on automobiles, and five-eighths of the current eight percent excise levy on automotive parts and accessories be transferred to the Highway Trust Fund from July 1, 1961 to July 1, 1964.

The tax increase would apply not only to gasoline, but to diesel oil. The one-cent increase in the present three cents Federal tax would yield an additional $380,000,000 for the remainder of the current fiscal year.

It would yield an estimated $580,000,000 for the fiscal year ending June 30, 1961.

Diversion of part of the excise tax revenue on passenger cars, plus parts and accessories, starting July 1, 1961, would bring in an estimated additional total of more than $2 billion.

As a result of the additional revenue in sight, Congressional leaders say that the Federal government would be able to allocate $1,800,000,000 to the various States this year for fiscal 1961, thus preventing a serious slowdown.

Social law Proposal

Congress for years now has amended the social security laws in election years rather than in odd years. A proposal that will be before Congress in 1960 will be one providing additional retirement credits for those working after 65. The bill, backed by Senator Joseph S. Clark, Jr., of Pennsylvania, would credit workers with 4 percent annually for each year of employment between 65 and 72. Workers would get no benefits while earning more than $1200 a year, but at 72 they would obtain 28 percent more benefits than now provided under the law.

Federal Airport Grants

The new program for federal airports grants will continue the present grant rate of $63,000,000 a year until June 30, 1961. The measure signed by President Eisenhower represents a tremendous retreat from the projected $465 million of annual grants which the Senate passed, and the House's $297 million bill. Both original bills called for four-year extensions, but President Eisenhower threatened to veto the larger appropriations. Whereupon Senator A. S. Mike Monroney, Democrat of Oklahoma, offered with reluctance the measure signed into law.

With air travel gradually converting to jet age travel, it appears only a matter of time until most airports will be expanded with longer runways and modern facilities. For instance, Congress has provided for the building of the most modern jet airport in the world at Chantilly, Va., 18 miles from Washington. Involving an outlay of more than $100,000,000, it will be opened by 1961. An eight-laned expressway will be built to Chantilly from Washington.

Governors' Measure Governor J. J. Hickey of Wyoming is backing a bill that would give the various governors more control over selection of the Interstate Highway routes in their states. The measure, pending before the Senate Public Roads Subcommittee, appears to lack solid backing in Congress. The Bureau of Public Roads is opposed to it. Under present law, the various highway departments have a free hand in making the route selections, so long as it meets with sanction of the Bureau of Roads.

Interest Rates up The high cost of borrowing money apparently will continue for many months, fiscal authorities and economists in Washington generally agree. However, it is unlikely that interest rates will increase further within the next year.

Asphalt Plus other Materials Maj. Gen. Louis W. Prentiss (ret.), executive vice president of the association, in testimony before House and Senate committees, declared that a reduction of $3 billion in net contract construction would result in a $600-million loss in paving material sales. He said asphalt's share is $300 million, or 23.1 million tons of asphalt mix at the present rate of $6.50 per ton.

Approximately 12 percent of structural steel capacity is being used for highway purposes. A number of other materials in substantial quantities including clay pipe and tile, reinforcing steel, aluminum, lumber, timber pilings, paint and explosives, are used in road construction.

Jobless Numbers To grow A 5 percent unemployed work force apparently is going to be normal for the next several years. Up to now 4 percent unemployed has been normal, but some of the foremost economists in the Nation's Capital are convinced the percentage is going to increase. Total U. S. unemployment is likely to climb well above 4,000,000 by 1960.

The rapidly increasing population is turning out more workers than there are jobs to be filled, plus the fact that industry is turning more and more to automation as wages and salaries continue rising. It is impossible to have a 100 percent employment, but even if it were possible some economists maintain it would not be good for the country.

Shippers Changing Some top railway officials in this country declare repeatedly and with emphasis that one of the troubles with railroads today is over-regulation by the Interstate Commerce Commission. The regulatory agency emphatically denies this.

Whatever the trouble, a member of the ICC, Anthony F. Arpia, declares that shippers are finding it easier to resort to unregulated transportation. He maintains that shippers in this country are becoming less and less reliant on public transportation. For a large number of shippers, public transportation is a second choice. Obviously something is wrong. The paramount question is: How can the trend be reversed and public transportation be preserved? No one has a simple solution.

Smaller cars, Less taxes Official Washington will be watching with more than marked interest as the big automobile makers in Detroit retreat from their longtime bigger and flashier automobile philosophy, to enter the small car field. The smaller cars with fewer refinements, of course, will mean less federal new car taxes to the Treasury.

However, Washington is not expecting any dramatic trend to take place in the new car field for the next few years. Yet it does expect that new big cars of the future will not get any bigger with parking space becoming more and more difficult. Meanwhile, small car imports into the United States continue to climb.

Pension Fund reports The Labor Department says about 150,000 employe welfare pension fund reports have been filed with the department under terms of the 1958 labor law amendments. However, a spokesman said that many thousands of welfare-pension fund descriptions are yet to be reported.

"After a fair trial by usage

WE ALWAYS RE-ORDER CEDARAPIDS COMPONENTS"

Says J. W. TAYLOR, of MEEKINS, INC.
Hollywood, Florida

Working 4 miles west of Ft. Lauderdale, Meekins' Plant #5 is producing 3/4", 3/8", 9/16" and 7/16" material at a 255 ton per hour rate, and crushing 85%. Cedarapids equipment includes a 2540 Jaw Crusher, 48" x 8' double-deck Vibrating Grizzly, a 40"x 10' Feeder, two 4033 Hammermills, and three 48"x 14' triple deck Horizontal Vibrating Screens. Plant #4 at Deerfield is working in limestone containing 30% silica and is producing 200 tons per hour of 3/8" pea rock, 9/16" material, and Mason sand, and is crushing 85%.

With four big plants operating in Florida, Meekins, Inc. knows what profit-engineered components mean to money-making stationary plant installations. That's why J.W. Taylor, Meekins' advertising and promotion manager, says, "The best recommendation any user can give a product is to re-order it after a fair trial by usage. The fact that we own many pieces of Cedarapids equipment which are in continual operation at several different plants speaks for itself. Our supervisor of pits and crushers informs us that we certainly get our money's worth with Cedarapids equipment, and our cost accounting department proves that point."

Mr. Taylor's enthusiasm for the big-capacity and low-maintenance benefits engineered into Cedarapids components is typical of stationary plant operators everywhere. Ask your Cedarapids Dealer for a fact by fact run-down on the complete line of Cedarapids equipment and the field experienced engineering assistance that "tailors" it to your requirements.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

There's a complete line of Cedarapids components for your stationary plant

20 Jaw Crusher Models

6 Roll Crusher Sizes

6 Double Impeller Impact Breaker Models

19 Models of Horizontal and Inclined Vibrating Screens

PLUS
Bins, Feeders, Conveyors, Hammermills, Vibrating Grizzlies, Spray Bars and Washing Plants

Some straight talk on

How to judge which jaw crusher

You read a lot of claims these days, advertising the tonnage output of this or that make of crusher at various pits around the country. Accurate though these reports may be, the overall result can easily lead to confusion. Unless you know all the variables — and you seldom do — you have no way of knowing how the reported equipment would perform at *your* pit, the only one you're really concerned about.

The way we see it, there's only one sure way to judge crusher values, and that's to take a really close look inside the machines themselves. Compare jaw area, angle of nip, length of stroke, and frame design. These are the things that *make* for low-cost-per-ton production. They're measurable. They're comparable. They apply to any set of operating conditions.

> Put a rock under "X" amount of compression, and it either *will break* or it *won't* — there's no in-between. That's why even "small" differences in rock crusher design — an eighth-inch of stroke, one degree of nipping angle, 5% more stored flywheel energy — can make *big* differences in final performance. Don't be lulled into the belief that all makes of jaw *crushers perform alike!*

One word of caution. When you make any such comparison; be sure you judge *all* makes of crushers on *equal* terms. Here are some things to watch for:

JAW OPENING: Is rated jaw opening measured in forward, neutral, or open position? Lippmann measures its jaw opening in the *forward* or "closed" position (ratings based on neutral or open-jaw position merely make the crusher look bigger on paper). Every Grizzly-King size and model has its own specially-designed frame . . . no beefed-up ratings from next-smaller sizes.

RATED TPH CAPACITIES: In making comparisons of rated tonnage output, be sure you compare on the basis of "like" reduction ratios. (Most manufacturers don't even rate their machines — nor recommend running them — at reduction ratios permissible with Grizzly-King.)

Also keep in mind there's considerable latitude in the way rated capacities are determined. Variables such as hardness of rock, r.p.m., and power consumption all enter the picture. It all goes back to the point we made earlier — it's safer to judge a crusher by "how it's built," than by production claims alone.

HIGH-STRENGTH DESIGN: High production is important, but it's only half the story. The final test is how well the crusher will *stand up* under top-rated production, year in and year out. A look at the comparative chart and cutaway (opposite page) shows how Lippmann stacks up against competition — sweeps the field in high-strength, low-maintenance design.

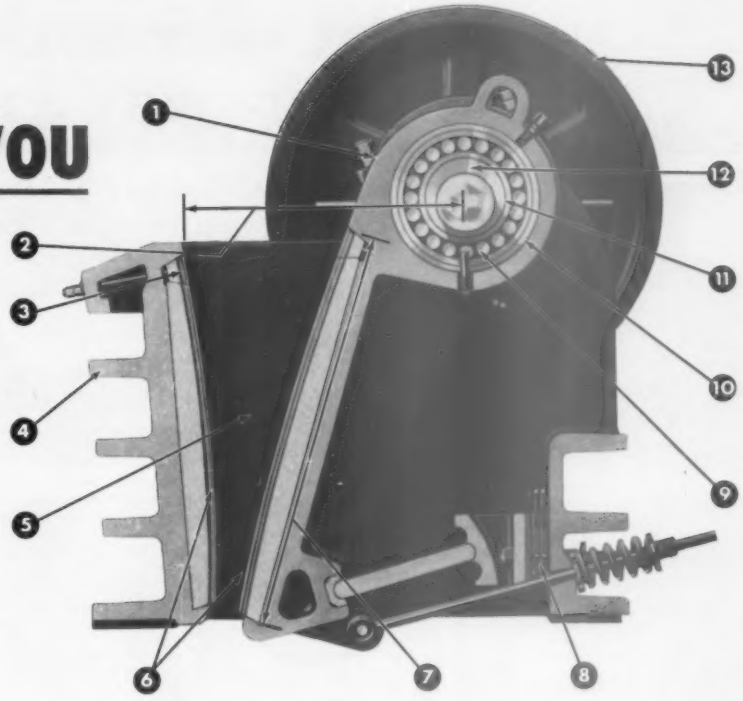
Naturally, you would expect to pay more for a crusher like this. But remember, it's *net cost per ton* over the life of the machine, not first costs, that determine your profit picture. *No* crusher is worth its price if it doesn't first give you what you set out to buy — a competitive bidding edge, and a good profit margin, on job after job. If you agree that this makes good business sense, you'll want to consider Grizzly-King before you invest in your next jaw crusher.

Lippmann jaw crushers available in sizes 10 x 16 to 42 x 48. For specific facts related to *your* operation, use Rock Products inquiry card, or contact your Lippmann distributor.

LIPPMANN Engineering Works, Inc., Milwaukee 14, Wisconsin

Jaw, Roll, and Gyratory Crushers • Conveyors • Vibrating Screens • Apron Feeders • Pulverizers • Bins, Hoppers • Portable Crushing Plants

is best for you



1. Contoured upper-jaw area, of heat-treated special steel, permits larger-size feed, minimizes bridging by slabby or large-size rock.

2. Shaft, set farther back from front of crusher, allows larger size feed, also makes side-feeding possible.

3. Die wedge has positive clamping action across full width of die.

4. Heat-treated special steel monolithic frame is reinforced at critical points of stress with heavy cast ribs. Inside contact surfaces are fully machined.

5. Cheek plates are reversible for double wear, are made of special, highly abrasion-resistant alloy steel.

6. Curved jaw dies give non-choking action, are reversible for double wear, corrugated for increased breaking force.

7. Compare Grizzly-King's 82-inch-deep jaw with any other 30 x 42 crusher! Lippmann's extra jaw depth gives you up to 37% more crushing area . . . reduces angle of nip for more efficient crushing.

8. Positive setting control, by means of shims, prevents slippage, permits easy determination of discharge opening.

9. *Radial thrust tapered roller bearings* stand the gaff of heavy operating loads . . . can be field-adjusted for running clearance and for wear (not possible with ordinary radial or roller-type bearings).

10. *Bearing retainer* (not generally offered in competitive crushers) is specially designed to facilitate quick, simple demounting of bearings .

11. 13" dia. heat-treated shaft, forged of alloy steel, handles extreme overloads with ease. No properly operated and maintained Lippmann Crusher has ever had a shaft or bearing failure!

12. Full 1½" eccentric throw gives you up to 16% longer crushing stroke.

13. 4 tons of flywheel weight (60" diameter) stores up tremendous energy for efficient operation and low power consumption. Flywheels are dynamically balanced . . . positive locked for safety.

Compare Lippmann Grizzly-King against any other make...here's the story on the 30x42

Size: 30 x 42	Grizzly King	Make "S"	Make "U"	Make "I" (1)	Make "D"	Make "L" (1)	Make "R" (1)	Make "G"	Make "P"
Lgth. of Swing Jaw Die	82"	N.A.	68.25	65"	69"	70"	73"	60"	65"
Lgth. of Stat. Jaw Die	75"	N.A.	60½"	57"	62¼"	66"	69"	55"	60"
Length of Jaw Stroke	¾"	N.A.	⅝"	N.A.	¾"	⅝"	N.A.	⅝"	⅝"
Min. and Max. Discharge Opening	3 to 10"	3 to 6"	4 to 8"	6 to 15"	4 to 8"	4 to 8"	4 to 8"	3 to 10"	4 to 8"
Shaft Dia. at Eccentric Brgs.	12"	N.A.	10.238"	10.238"	11"	10¼"	11"	9½"	9.450"
Capacity in TPH at 5" Opening	300	200-255	183-270	140-240(2)	110-450(3)	150-225	140-200	130-200(4)	250
HP Required	100-130	125-150	140-165	125-150	100-150	100-150	150	100-150	100-130
Shipping Wt.	64,000#	60,500#	42,000#	48,000#	56,000#	47,000#	46,900#	46,000#	40,850#
Adjustable running clearance on bearings	Yes	No	No	No	Yes	No	No	No	No
Oil lubrication throughout	Yes	No	No	No	No	Yes	No	No	Yes
Individual Jaw Brg. Protective Enclosure	Yes	No	No	No	No	No	No	No	No

(1) Closest comparable size rating, 32 x 40 (2) At 6" opening (3) At 4 to 8" opening (4) At 4 to 6" opening

(data from latest available published literature)

F-C-6-59

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LABOR RELATIONS

A ROUNDUP OF ACTUAL DAY-TO-DAY IN-PLANT PROBLEMS AND HOW THEY WERE HANDLED BY MANAGEMENT MEN

How would you decide?

If employes return from a strike and there is no work for a few hours, are they entitled to reporting pay?

What Happened: After the strike ended suddenly, 30 workers showed up the next morning ready and willing to go to work. The foreman was unprepared for their return. "It'll take a few hours for me to plan my schedules. Why don't you fellows go home and come back this afternoon?" he said.

This they did. When payday came around they demanded 4 hours reporting pay. They cited their union contract which said that if a man comes to work and there is no work available, he is guaranteed 4 hours pay.

The company answered: This is no normal situation. Reporting pay applies only on routine operations. These men caught us flatfooted. The strike ended suddenly and we had no time to prepare for them.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Smith ruled: "Reporting pay applies, obviously, to routine scheduling practices when the plant is operating normally, when an employe who has been working appears on his regular schedule without having received prior notice not to report—or when an employe is ordered to report outside of his regular schedule and does report. It cannot be reasonably applied to the situation obtaining upon the termination of an extended strike. Grievance denied."

If an employe clocks in early and is asked to work, is he entitled to 4-hours "call-in pay?"

What Happened: One morning, about 7 o'clock, a valve broke. The maintenance foreman spied 3 of his morning-shift crew chatting near the time clock. "Come on in, men," he said. "I've got a job for you right away."

"We're not due for half an hour yet. We came in early," was the reply.

"That's okay. Clock in now and I'll pay you overtime. A valve has gone out," the foreman answered.

The men clocked in and went to work. At the end of the week they received ¾ hour pay. (This was time-and-a-half for the ½ hour they clocked in early.) But the men claimed 4 hours call-in pay. They argued: We were called in to handle an emergency. We're entitled to the 4-hour guarantee in the contract. The company refused. Its position was:

1. These men were not called in outside their regular hours. They were in the plant and were asked to work ½ hour overtime before their shift started. This doesn't entitle them to call-in pay.
2. The purpose of call-in pay is to compensate employes for inconvenience or hardship if they are called in to work when they are away from the plant.

3. These men are entitled to overtime and that's what we paid them.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Hale, chairman, ruled: "Call-in pay must be given if either of two situations occur—(1) an employe is called in to perform work outside his regularly scheduled shift and (2) the employe does that work at a time when he ordinarily would not be on the premises. Arbitrators generally are agreed that the purpose of call-in pay is to compensate an employe for inconvenience to which he is put or hardship he suffers or extra expense he may incur in being required to perform work outside his regularly scheduled hours and at a time when he otherwise would not be on his employer's premises. These men are not entitled to call-in pay."

END

These Special Excavating Jobs Are Best Handled by Sauerman DragScrapers

Deep Digging

900-FT. SPAN— 65 FT. BELOW WATER...

Load is deposited by tensioning the track cable, thus lifting the DragScraper from the pile. Tensioning continues to the desired height for releasing the DragScraper and returning it by gravity to the pit.

Operator controls digging and hauling from cab in head tower.

"the 10-yd. DragScraper is doing a wonderful job and we could not operate without it..."

Louis Chinelli, Gen. Supt.
Redman Concrete Corp.

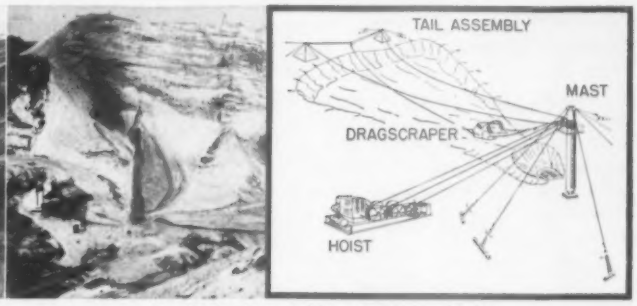
Redman had been trucking material at a cost of $35,000 a year to the location where the DragScraper is now placing it. The 10-yd. Sauerman covers a pond area of 1500′ by 3000′ and is digging 40 ft. deeper than their previous dragline could operate.

The DragScraper digs and hauls on a 900-ft. span. It operates between a 90-ft. fixed head tower and a 40-ft. mobile tail tower which may be shifted to change the line of operation. The company's 1000-yd.-per-day batch plants and its fleet of mixers and trucks are kept busy by the steady flow of material supplied by the DragScraper.

High Bank Digging

175 FT. HIGH— 600-FT. HAUL...

DragScraper digs from high bank.



Overall view shows height and steepness of bank. Diagram shows details of Sauerman installation.

"I have nothing but praise for our 4-yd. Sauerman Machine. Since the DragScraper began operations in 1952, we have worked it continuously 12 hours a day..."

John D. Robertson, Gen. Supt.
Chandler's Palos Verdes Sand & Gravel Co.

By working down from the top of the 175-ft. bank, the material flows ahead of the DragScraper. This provides bonus loads on each haul and substantially lessens the danger of cave-ins.

Operating cables are powered by a Sauerman three-drum electric hoist. Equipped for rapid shifting, the DragScraper can be quickly positioned to any line of operation between the two tail towers at the top of the bank and the headpost at the hopper.

The plant is the largest sand producer in the South Los Angeles area and, together with two ready-mix plants, keeps 22 ready-mix and 18 dump trucks busy.

The best Sauerman Machine for your plant is governed by the nature of the deposit, location of material, the depth and plant layout. Consult Sauerman engineers about your plant. Their recommendations will be based on fifty years of excavating machinery experience. Ask for Catalog A (DragScrapers). Sauerman News Nos. 149 and 150 describe the above installations in greater detail.

SAUERMAN BROS. INC. 630 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DURALITE BLOCKS

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PEOPLE IN THE NEWS

Sales manager for Dundee Cement Co.

RAYMOND S. CHASE, former Masonite Corp. executive, was appointed sales manager of the Dundee Cement Co., Dundee, Mich. An architectural engineering graduate of Washington State University, Mr. Chase is a member of the National Association of Home Builders.

Wirkus to hold PCA post

EUGENE A. WIRKUS has been appointed field engineer on the metropolitan Los Angeles staff of the Portland Cement Association. Mr. Wirkus was formerly an associate highway engineer in the design department of the California Division of Highways. He is a member of the American Society of Civil Engineers and attended the University of Southern California in Los Angeles.

Canadian Gypsum appointment

R. W. KYLE has been named general merchandise manager of the Canadian Gypsum Co., Ltd., Toronto, Canada. Mr. Kyle joined the company in 1947.

H. J. Kaiser yields posts in four firms

HENRY J. KAISER has turned over his post as president and chief executive officer of the four major companies in his industrial empire to veterans of long service with each, and the chairmanship of each to his son, Edgar F. Kaiser.

The companies affected and their new presidents are: Kaiser Steel Corp., J. L. Ashby; Willys Motors, Inc., S. A. Girard; Permanente Cement Co., W. A. Marsh, and Kaiser Aluminum and Chemical Corp., D. A. Rhoades.

Mr. Kaiser, seventy-seven, has assumed the post of "founder-chairman" of the four concerns.

E. E. Trefethen Jr., formerly executive vice president of each of the four major Kaiser units, has been named to the newly created post of vice chairman of each.

Schweim receives ASTM merit award

HENRY J. SCHWEIM, manager of the Gypsum Association's western office,

Hollywood, Calif., was presented the "Award of Merit" by the American Society for Testing Materials at the society's 62nd annual meeting in Atlantic City, N.J.

Mr. Schweim, who has been in the gypsum industry since 1915, was presented the award for "having rendered distinguished service to the society, especially along technical lines."

From 1926 to 1947 Mr. Schweim served as the general manager of the Gypsum Association, headquartered in Chicago; and has assumed the duties of the association's western manager since 1947. Prior to 1926, he served as sales engineer, supervisor of sales, development engineer and district manager for the United States Gypsum Co.

Promoted by Flintkote

WILLIAM FEIK, JR., formerly vice president and treasurer of the Flintkote Co., has been elected vice president in charge of sales.

James E. McCauley, who served as vice president and treasurer of Orangeburg Manufacturing Co., a Flintkote division, has been named treasurer of Flintkote to succeed Mr. Feik.

Gene C. Curry, secretary of the Blue Diamond Division, was named secretary of the parent firm.

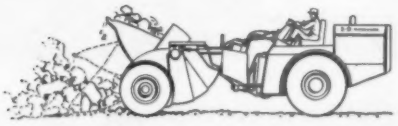
All three will have their headquarters at Flintkote's executive offices in New York City.

Mashburn named at Keasbey & Mattison

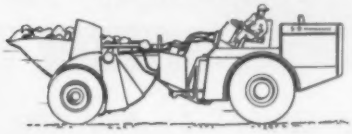
WILLIAM H. MASHBURN has been named Houston district manager by Keasbey & Mattison Co., Ambler, Pa., manufacturers of asbestos, asphalt and heat insulating products. Mr. Mashburn joined Keasbey & Mattison in 1946 as a general line salesman in the company's Houston district. He has also been an asbestos-cement pipe salesman and has served as manager of the asbestos-cement pipe department in the Houston district. He was formerly with the Arkansas Foundry Co., Little Rock, Ark. END

Now a SELF-LOADING TRUCK! The proved S-D TRANSLOADER

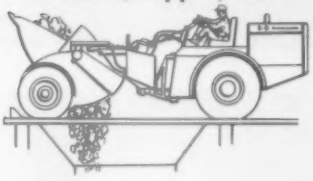
1. LOADS itself!



2. TRANSPORTS load!



3. DUMPS load into crusher, hopper, etc.



- Eliminates Shovels, Loaders and Trucks!
- One man (Transloader operator) does the job!
- No synchronization of several pieces of equipment!

THIS HIGH-SPEED Self-Loading S-D Transloader promises you tremendous savings! Now you can eliminate (1) costly investments in shovels, loaders and trucks! (2) Eliminate multiple manpower in shovel, loader and truck operators! (3) Eliminate standing idle time of shovel or loader equipment, and (4) standing idle time of the operator when he doesn't have a truck to load! (5) Eliminate standing idle time of trucks and (6) their drivers while trucks are being loaded! (7) Eliminate the maintenance and costly upkeep of all this machinery and equipment! The one-man operated SELF-LOADING S-D TRANSLOADER shuttles back-and-forth between loading point and dumping station! Your S-D Transloader will keep working full time—loading, transporting and dumping in continuous, uninterrupted performance cycles! All facts and information, including illustrated literature, specifications, time studies, maintenance data, etc., are all packaged and ready for mailing to you on request, plus name of dealer nearest you. Write or call us today! *Sanford-Day Iron Works, Inc., 612 Dale Avenue, Knoxville, Tenn. Telephone: 3-4191.*

SANFORD-DAY

KNOXVILLE, TENNESSEE

TO: Sanford-Day, 612 Dale Avenue, Knoxville, Tenn.

Gentlemen, please forward by return mail Complete Information Packet on the S-D Transloader:

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FIRM _____

ADDRESS _____

CITY _____ STATE _____

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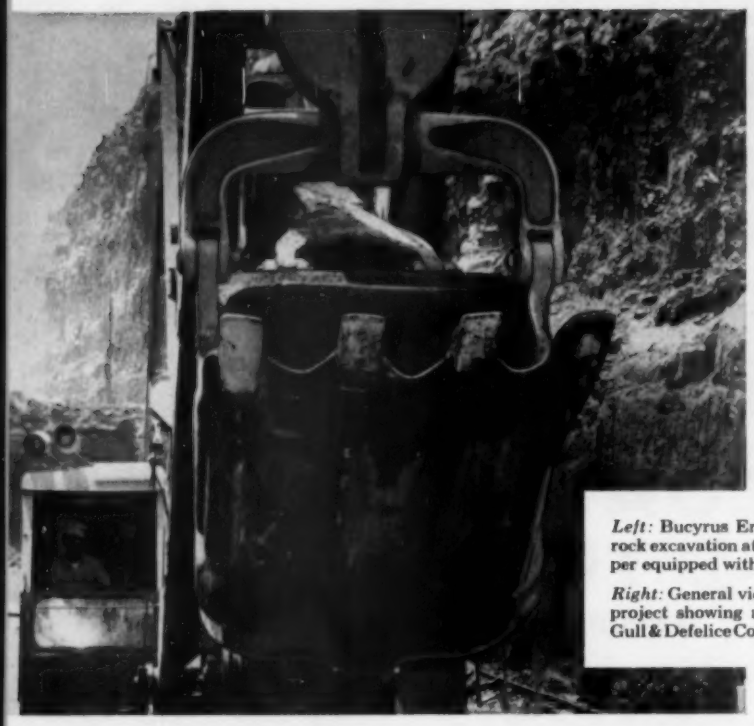
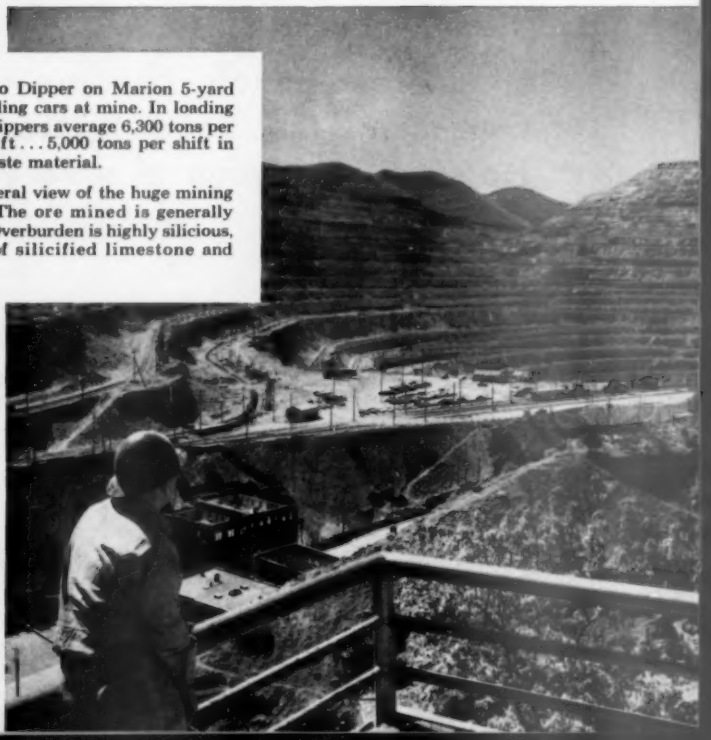
How AMSCO helps you MOVE



Left: Bucyrus Erie 88B shovel used for rock excavation at Conduit #2 South. Dipper equipped with Amsco Simplex Teeth.

Right: General view of Conduit #2 South project showing rocky terrain in which Gull & Defelice Construction Co. operates.



Left: Amsco Dipper on Marion 5-yard shovel, loading cars at mine. In loading ore, these dippers average 6,300 tons per 8-hour shift . . . 5,000 tons per shift in working waste material.

Right: General view of the huge mining operation. The ore mined is generally porphyry. Overburden is highly silicious, composed of silicified limestone and quartzite.

MORE TONS PER DOLLAR

Read these user reports on how AMSCO Dippers and Teeth perform in rugged digging service

ON THE NIAGARA POWER PROJECT

40,000 YARDS OF ROCK HANDLED BEFORE AMSCO 2-PART TEETH NEED REPLACING

Gull & Defelice Construction Co. is working on Section 3 of the powerhouse conduit project – excavating 140 feet deep, almost entirely in rock. All five power shovel dippers on the job are now equipped with Amsco Simplex 2-Part Reversible Teeth.

These dippers work *16 hours a day, 6 days a week for 2 weeks—handle approximately 40,000 yards of rock*—before tooth replacement is required.

Says Mike Cazzolla, Equipment Superintendent, in talking about the Amsco teeth: "They're built rugged and take a lot of punishment from the rock. We get longer wear out of them because we can turn them over." He's referring, of course, to the reversible tip feature.

John Cazzolla, Master Mechanic, adds the important fact that *they can replace these teeth in ten minutes with no trouble.* This feature, together with the longer wear, means important savings in downtime.

AT ONE OF WORLD'S LARGEST COPPER MINES

THEY USE AMSCO DIPPERS ...FOR HIGH-SHOCK, HIGHLY ABRASIVE DIGGING

This huge copper mine operates the largest collection of big power shovels (5 yards and up) in the world. For this rugged service they use Amsco dippers to strip off extremely abrasive overburden ... handle waste material ... and load copper ore. These are cast manganese steel dippers – built for toughness, high abrasion resistance and long service life.

For rugged digging anywhere

...wherever high impact and abrasion are problems, you'll "move more tons per dollar" with Amsco Manganese Steel Dippers and Simplex 2-Part Reversible Teeth. See your power shovel equipment dealer for sizes and types available. Or write us direct for technical bulletins on Amsco Dippers and Simplex 2-Part Teeth.

AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

Other Plants In: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis
In Canada: Joliette Steel and Manitoba Steel Foundry Divisions

Exact moisture content of rock, sand or any soil measured instantly, automatically by new portable moisture meter

Avoid costly delays and equipment downtime by taking the guess-work out of moisture content. This lightweight electronic instrument, slung over the shoulder, measures instantly and accurately the exact moisture content of surface or sub-surface rock, sand, soil or any bulk material. Water content registers immediately on the dial when the probe, connected by insulated cord to the meter, is pluged into the material. In seconds you meet the increasingly more stringent specifications on highway and public work projects and in batching concrete and other materials. It will pay you to investigate the cost-saving advantages of instant, accurate determination of moisture content with C&W Portable Moisture Meter, companion instrument to C&W standard moisture meter used more in daily operation than all other makes combined.

For additional information write

C & W SALES CO.

1490 Franks Lane, Menlo Park, California

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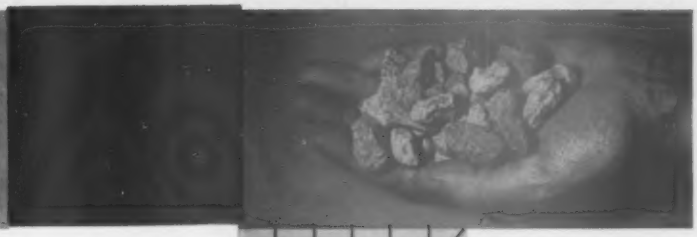
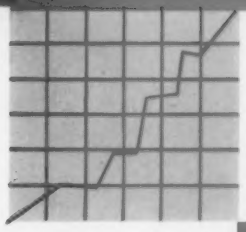
IT PAYS TO ENGINEER YOUR PLANT!

to get the ***most*** *from your plant investment dollar*



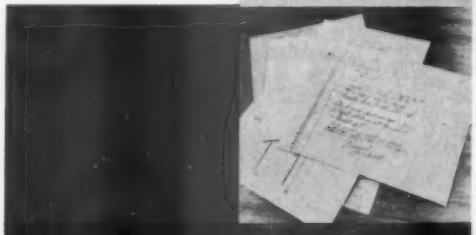


The combined efforts—and experience—of you and the men of WKE can tell you *if* your proposed aggregate plant will be profitable . . . and *how* profitable!

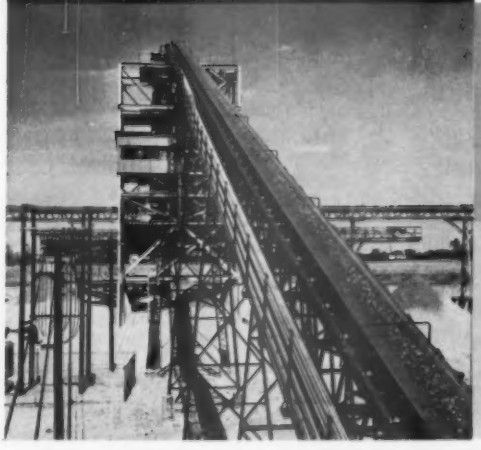
A WKE feasibility study—the starting point of any sound plant development—considers every factor: mining and process methods; aggregate specifications, markets, labor, transportation requirements; estimates of taxes, amortizations, depreciation; a detailed forecast of the investment and operating requirements in terms of dollars and cents.

WKE experience in plant design and construction, equipment and modern aggregate production methods will provide the basis for a clear, unbiased picture of your operating potential.

It will pay you to consult the men of WKE along with your know-how for the profitable future of your plant-in-prospect.



FEASIBILITY STUDIES



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INDUSTRY NEWS

Working far out on the 12½-mile fill, trucks build up the causeway surface. Fill is up to 102 ft. high, required 44 million cu. yd. of stone and gravel

New Salt Lake roadbed project opens for rail traffic

THE HUGE $49-MILLION rock and gravel roadbed project, in which the Southern Pacific Railroad replaced 12.6 miles of wooden trestle over Great Salt Lake in Utah, opened to traffic late in July. The expensive improvement permits trains to move at regular speeds.

The colorful project, involving the moving of rock and gravel totaling nine times the volume of an Egyptian pyramid, required 12 million cu. yd. of broken rock and 32 million cu. yd. of sand and gravel. About 15 million cu. yd. of lake-bottom mud was removed to make a firm base for the fill, which ranges up to 102 ft. deep and 600 ft. wide. Width of the double-track causeway is 35 ft. at the surface. In recent months, the two largest non-atomic blasts in history loosened rock for the big fill.

NSGA announces 1958 production survey results

THE NATIONAL SAND and Gravel Association's sixth annual production survey discloses some interesting facts about the industry. The typical producer (422nd largest of the 844 firms reporting) produced more than 100,000 tons of sand and gravel last year, but less than 200,000. His average selling price was $1.13 per ton, compared with $1.10 in 1957.

The percentage shipped by truck continued high, with the 1958 figure at 73.1 percent. Only about 17 percent was shipped by rail.

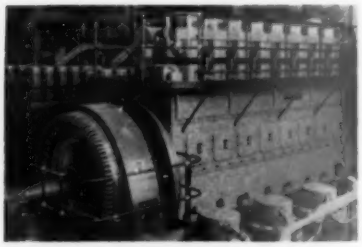
Construction and ready-mixed concrete firms continue to take about three-fourths of all sand and gravel, NSGA reports. The construction industry consumed 44.1 per cent, and ready-mixed concrete, 31.5 percent.

Philippines' Rizal Cement Co. generates own power

BIG DIESEL GENERATING PLANTS are giving Rizal Cement Co., Philippines, electric power at a cost of 1½ cents per kwhr., a lower figure than for purchased power, and lower than for other producers there.

First reason for the low cost is the use of residual (bunker) fuel, which costs five cents per gallon less than diesel fuel. Self-opening centrifuges purify the fuel. They operate for many days without disassembly; accumulated solids are shot from the centrifuge bowls two or three times per eight-hour shift. The generating units all have single selector valves which permit selection of either diesel or residual fuel.

The other reason for the low power cost at Rizal is the firm's high standards of maintenance and cleanliness. Dusting is done regularly, as is lubrication. Operators for the plant are chosen from among graduating mechanical engineers of Manila's engineering colleges.



Big 1,769 hp. 8-cyl. engine drives 1,750 kw. generator; pair is newest at Rizal

One of the engines has run steadily since it was installed in 1952. Result of Rizal's careful maintenance: It still uses the original rings, has never been overhauled. In fact, the engines are so clean that W. W. Brown, service engineer there for the manufacturer, Enterprise Engine & Machine Co., San Francisco, wonders if cement dust has any unsuspected lubricating properties.

(Continued on page 37)

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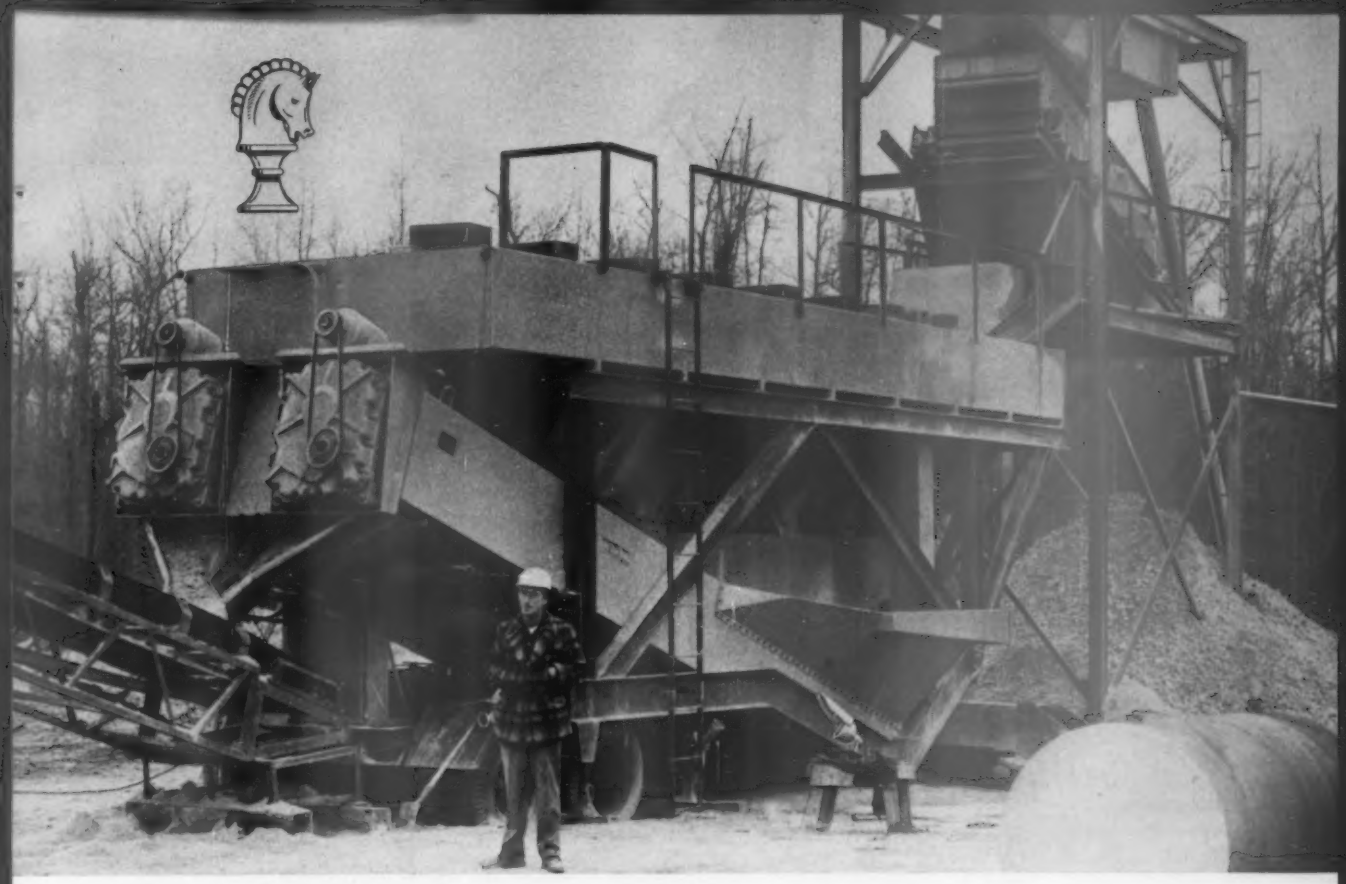

"Real Low Cost Per Ton"

Says Grady Jordan, co-owner of A & B Materials Co., Warner Robbins, Ga.

"Our Eagle Portable Sand Section Is Producing 1500 Yds. Per Day of Air Force Specification Sand — And At A Real Low Cost Per Ton" Mr. Jordan, shown in front of his plant, further states, "With our Eagle Portable Washing-Classifying-Dehydrating Section we can quickly pull up stakes and move to another job site when we finish up here. With proper adjustment of the Water-Scalping-Classifying Tank and the two screw units we can readily meet specifications." Material is for air base runways. Cornell Young Co., long a user of Eagle Equipment, is also supplying material for this project. Get the facts on Eagle "Portables"—send for Catalog 58.

Both screws on A & B Materials Co.'s portable section are producing concrete sand—where each screw is to produce a different gradation the delivery chutes can be quickly switched as shown above.

The Eagle Portable Section has a complete water scalping-classifying tank with fully automatic bleeder valves and metering "splitter" gates just like a stationary sand washing-classifying section plus two independent screw units which can produce the same gradation or each a different gradation.

SINCE 1872

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EAGLE IRON WORKS

EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

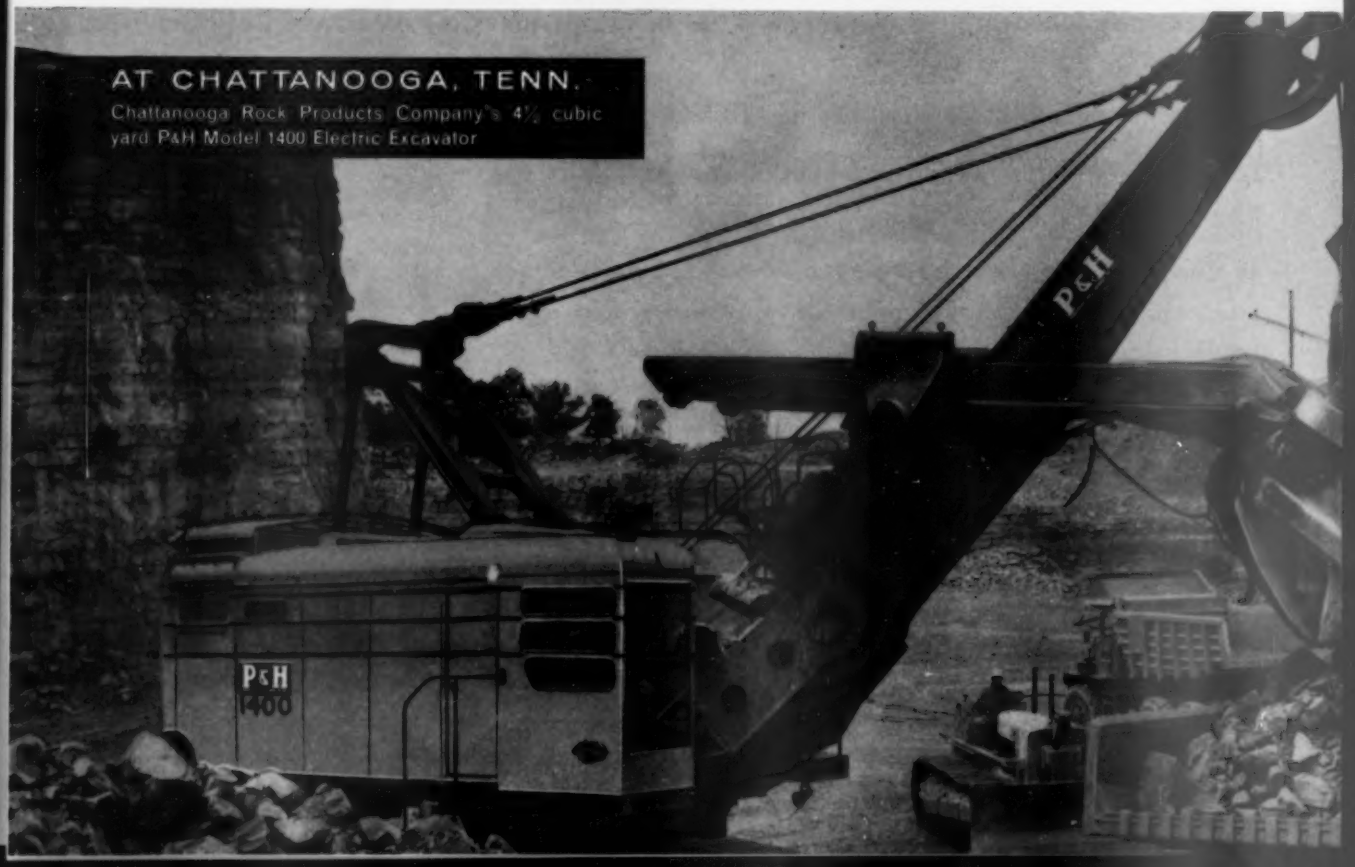
137 HOLCOMB AVE., DES MOINES, IOWA

Factory-Trained Distributors Everywhere

AT McCOOK, ILLINOIS

Consumer Company's 5 cubic yard P&H Model 1500 Electric Excavator

WITH VULCAN MATERIALS COMPANY



AT CHATTANOOGA, TENN.

Chattanooga Rock Products Company's 4½ cubic yard P&H Model 1400 Electric Excavator

One P&H always sells another because

P&H "PROFIT·TONS" reduce loading costs all day...every day

Up to 30% higher bail pull for more uniform dipper speed in the pile—faster swing—exceptional physical strength of P&H welded construction—greater job availability all add up to as much as 10% more production, lower loading cost per ton and *more net profit* for owners of P&H Electric Mining Excavators.

P&H "Profit-Tons" are the end product of these *exclusive* P&H design principles:

MAGNETORQUE® . . . the most productive digging motion drive known for electric excavators. This patented P&H hoist drive electro-magnetically transmits the full digging power of an A.C. hoist motor direct to the dipper *without motor generator set conversion to D.C. current.* It gives higher bail pull, greater dipper fill factor and automatic impact protection to the digging machinery.

ELECTRONIC CONTROL . . . this patented P&H control accomplishes the quickest work motion reaction time known on electric shovels. Control maintenance expense is reduced as much as 80% by elimination of all moving parts for a completely closed circuit system.

In addition, with P&H—and only with P&H—do you get the service assurance of single source responsibility. P&H manufactures their own electrical as well as mechanical components—*designed specifically for electric excavator service.* Write Dept. 558A, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

P&H LINE:

Electric Excavators:	3¼ through 10 yds.
Diesel Excavators:	⅛ through 3¼ yds.
Truck Cranes:	10 through 80 tons

P&H **MINING EXCAVATORS**

HARNISCHFEGER CORPORATION
Construction & Mining Division
Milwaukee 46, Wisconsin

HARBISON-WALKER BALANCED LININGS

In the operation of rotary lime and dolomite kilns, there are many variables that affect the life of the refractory linings. Various destructive factors to which the refractories in different zones are subjected include impact and abrasion of the charge, corrosion by fuel ash and the charge at the high temperature of firing and spalling caused by thermal shock. Best results are assured when the properties of the refractories in each zone are balanced in relation to service life and cost.

Harbison-Walker refractories include all classes of brick, castables, plastic fire brick, mortars and insulating products.

Harbison-Walker freely offers technical service and recommendations that can result in the best balance for your particular conditions.

FOR HIGH TEMPERATURE ZONES

ALUSITE: This leading brand of 70% alumina refractory owes its extremely wide use for rotary lime kiln linings to its unusual combination of desirable properties. Its high density and low permeability account for its excellent resistance to penetration, such as promotes fluxing. ALUSITE is strong and highly resistant to mechanical stresses, abrasion and thermal shock.

FORSTERITE and THERMAG, Harbison-Walker basic brick fulfill the most severe burning zone requirements for extremely high temperature firing of refractory dolomite and for highly corrosive conditions such as accompany the burning of lime sludge of high alkali content.

FOR COLD ZONES

DURO (Pa.), WYLAM A (Ala.). These brands are the outstanding wear-resistant rotary kiln liners for cold zones of limestone burning kilns and for chain sections of lime sludge kilns.

FOR INTERMEDIATE ZONES

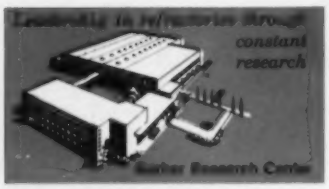
ALAMO (Super-Duty), and other Harbison-Walker super-duty and high duty brands of fireclay brick provide the best linings for the intermediate zones. The availability of these refractories from widely distributed plants in seven states, facilitates deliveries and assures lowest transportation costs.

MONOLITHIC REFRACTORIES

H-W EXTRA STRENGTH CASTABLE, among the various classes of monolithic refractories, is strongest and most resistant to impact and abrasion. It is easily applied around all designs of chain holders and renders excellent service in positions which are subjected to extreme wear.

VERTICAL SHAFT KILNS

The refractories here briefly explained for their use in rotary kilns supplemented by H-W SILICON CARBIDE and KORUNDAL (90% alumina), serve with superior results and best economy for every particular need of center fired and mixed feed shaft lime kilns.



HARBISON-WALKER REFRACTORIES CO.

AND SUBSIDIARIES

GENERAL OFFICES: PITTSBURGH 22, PENNA.

World's Most Complete Refractories Service

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(Continued from page 32)

On the cover . . .

OPERATIONS IMPROVEMENT is more than machinery and production efficiency at Vulcan Materials Co. It takes maps, market studies and legal tomes to chart the logistics of expansion in the Chicago area for the Consumers Company Division. That's why Vulcan's Charles W. Ireland, Chairman of the Board (left) is having a shirt-sleeve conference with Consumer Co. management, Don Wendling, Vice President—Sales, and Clay Lambert, Vice President—Operations (right), to ponder a thorny problem of plant location and market penetration.

Rock firms report improved sales figures

HERE ARE SALES FIGURES reaching ROCK PRODUCTS of some of the most important producers in the rock industries. Most are impressively higher than last year, due to better spring weather, plus better highway and housing records.

Company	Period	Sales (millions)
American Aggregates	yr. to 3/31	$ 17.1
Kentucky Stone Co.	yr. to 4/30	2.3
National Gypsum Co.	half to 6/30	106.3
Flintkote Co.	half to 6/30	98.4
Ruberoid Co.	half to 6/30	43.1

Cement producers reported the following outstanding first-half sales figures. Gains were largely due to the bright road-building picture, which includes spending up 22 percent over 1958 for the first six months of this year.

Company	First half sales (millions)	Gain over last year
Allentown Portland	$ 6.7	25%
Alpha Portland	17.1	31
General Portland	33.5	31
Ideal	47.2	23
Keystone	5.9	22
Lehigh	37.3	13
Marquette	25.3	11
Missouri Portland	10.3	21
Penn-Dixie	21.4	9

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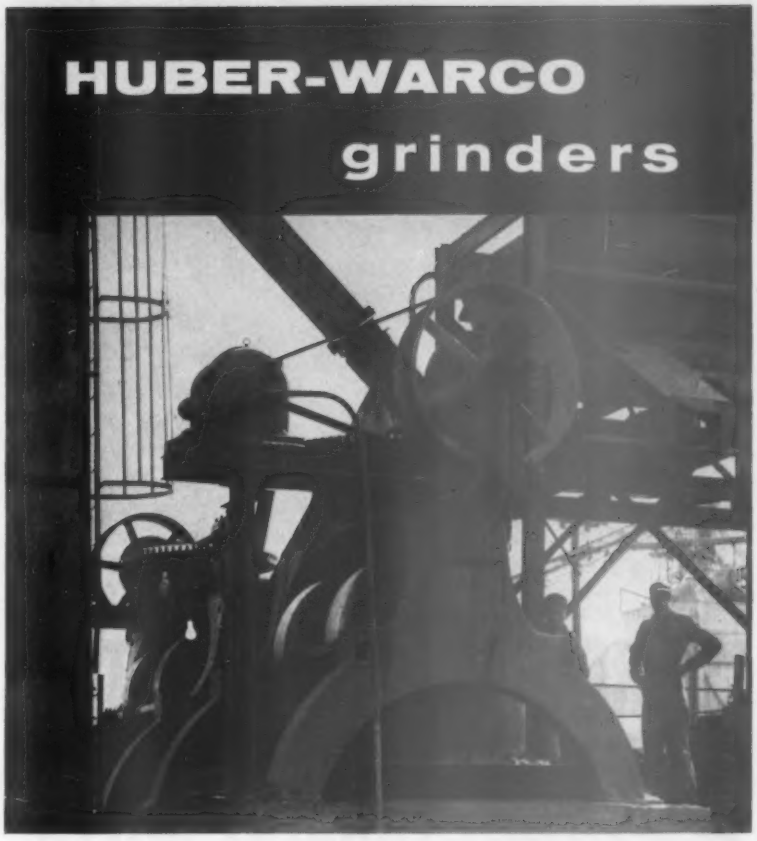

big volume, low cost grinding

Here's what a Huber-Warco No. 9 GRINDER can do for you . . . easily deliver up to 30 yards per hour . . . grind wet or dry with no screen plates required . . . prepare accurately-sized aggregate from such materials as cinders, slag, haydite and pumice . . . require practically no maintenance . . . and assure years of trouble-free operation. The No. 9 GRINDER has been designed to handle aggregate reduction with a considerable savings in power consumption. The rugged construction virtually eliminates shutdown time. Whatever your capacity requirement, there is a Huber-Warco GRINDER that will do the job more efficiently. Capacity range is from 4 to 75 yards per hour. Write for details.

A product of HUBER-WARCO COMPANY, Marion, Ohio, U. S. A.

HUBER-WARCO COMPANY, Marion, Ohio, U.S.A.

☐ Please send me specifications on the Huber-Warco No. 9 Grinder

Name .....

Title .....

Company .....

Address .....

City ..... Zone ..... State .....

HUBER W WARCO

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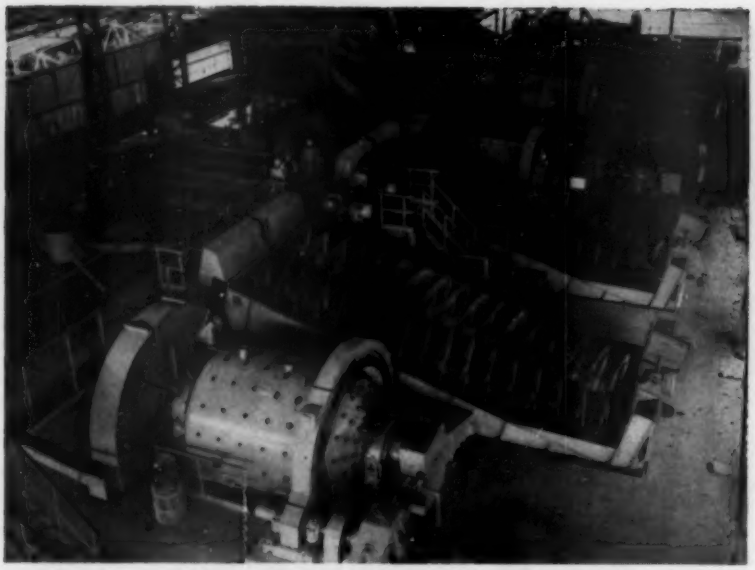
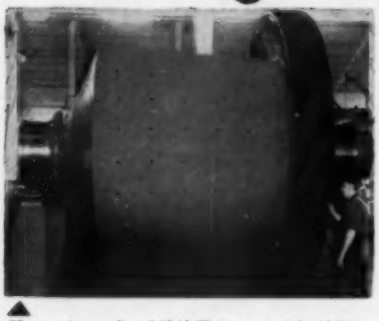


Shown here are four Hardinge 9-3-6-8 Tricone Mills grinding sulfide copper ores and mixed ores in a concentrating plant in the Belgian Congo, Africa.

CORRECT BALL SEGREGATION
in the
Hardinge TRICONE MILLS



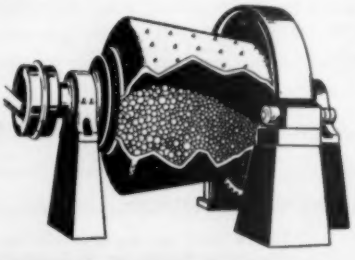
Shop view of a 10½′ Tricone with 9′ long tapered shell.

Highest grinding efficiency and lowest ball and lining wear are common to mills with a correctly segregated ball charge.

The Hardinge Tricone Mill is the only mill providing these essentials to low cost operation without the use of special linings or internal devices, which are subject to wear and are effective through only a part of their wearing life.

The Tricone also occupies less floor space for its grinding volume than any other ball mill built.

Every ball in the Hardinge Tricone Mill "minds its own business!"



Complete specifications upon request. Bulletin AH-414-7.

HARDINGE
COMPANY, INCORPORATED
YORK, PENNSYLVANIA • 240 ARCH ST. • Main Office and Works
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(Continued from page 37)

Dramatic concrete offices will house American Cement

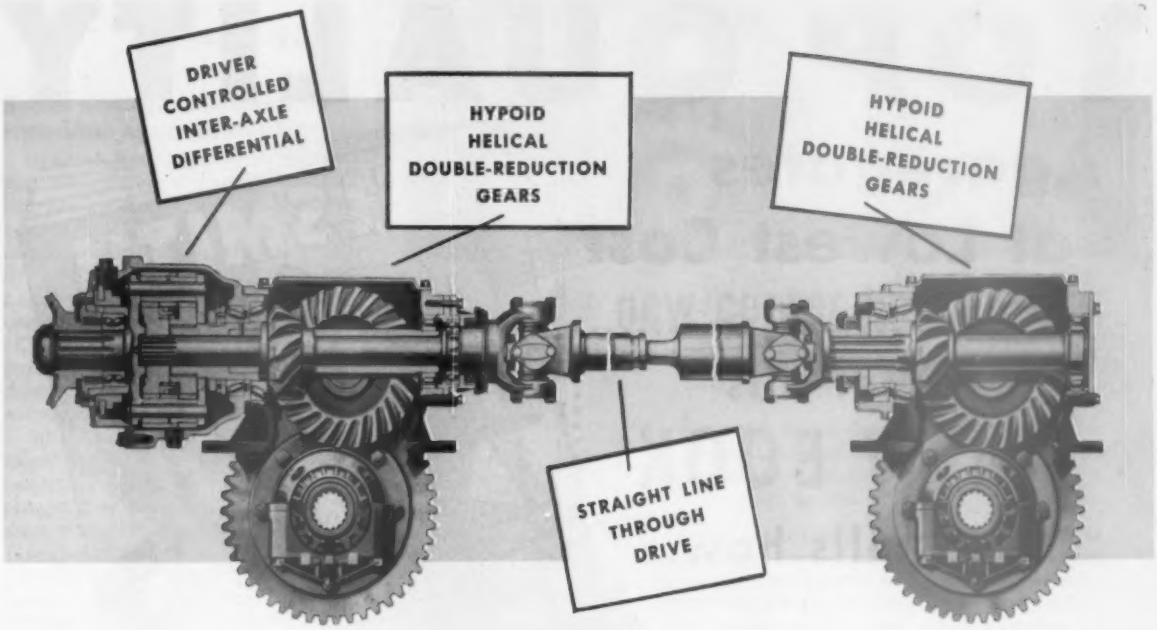
AMERICAN CEMENT CO. plans to complete its new headquarters office building in downtown Los Angeles in about a year. The dramatic concrete structure is topped by a nine-story tower which uses highly unusual sculptured concrete screens as bearing walls on two sides. The walls take the full lateral and vertical loads on the tower; they also eliminate all columns in the interior of the offices.

Parking is well provided for—both underground space and the second and third floors are devoted to space for 300 cars. Reinforced concrete screens surround this second and third floor parking area, eliminating the use of mechanical equipment and appreciably cutting construction costs. The back part of the building, not occupied by the tall tower, is a terrace topped by a graceful folded-plate concrete roof. American has taken good advantage of this chance for showing concrete's ability to be molded into almost any desired shape.

Cement shipments expected to top 330 million bbl.

CEMENT SHIPMENTS through May were 18 percent above the total for the first five months last year, the Bureau of Mines reports. Shipments of cement in May were only 8 percent above that month last year, however, apparently because it was just a year ago May that sales began to pick up. Many industry officials expect shipments to rise by 10 percent this year from the 307 million bbl. figure registered last year. This total of 338 million bbl. would break the 1956 record of 309 million bbl. by a wide margin.

(Continued on page 41)


DRIVER CONTROLLED INTER-AXLE DIFFERENTIAL
HYPOID HELICAL DOUBLE-REDUCTION GEARS
HYPOID HELICAL DOUBLE-REDUCTION GEARS
STRAIGHT LINE THROUGH DRIVE

Hypoid Double-Reduction Gears Make

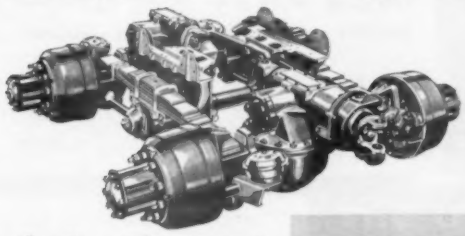
TIMKEN-DETROIT® HEAVY-DUTY TANDEMS

first in performance, long life and low maintenance cost!

Timken-Detroit Heavy-Duty Tandems with Hypoid Helical Double-Reduction Gears give you payload leadership, long trouble-free service, economical performance. Here's why –

True Double-Reduction. Two full sized gear sets form a balanced power train with each gear set accomplishing a healthy reduction. Husky hypoid first reduction gears and wide faced helical second reduction gears combine to form a rugged double-reduction drive that will outperform all others.

Widest Choice of Axle Ratios. Timken-Detroit "balanced design" full double-reduction does not limit the secondary gear set to a fixed low numerical value which depends on primary gear set for all ratio changes. The hypoid-helical gear arrangement permits a wider range of ratios because the numerical value of both the primary and secondary ratio gear sets can be varied.



Top-Mounted Straight Line Drive. Eliminates all prop shaft angularity. Bearing and gear life is increased. Maintenance costs reduced. Top-mounted position of carriers provides main drive shaft alignment – ideally suited for short wheel base trucks or tractors.

Driver Controlled Inter-Axle Differential. Divides torque equally between axles, yet compensates for any differential of speed between the axles. Both axles are always doing equal amounts of work . . . can be locked out at any speed when poor traction conditions exist.

Tough, Torsion Flow Axle Shafts Are Best By Any Test. Don't be misled . . . patented Torsion Flow Axle Shafts are still the best available to the American Trucking Industry. Comparison tests prove that Timken-Detroit Axle Shafts, spline diameter for spline diameter, are the toughest ever made.

©1959, R-S Corp.

World's largest manufacturer of axles for trucks, buses and trailers

Another Product of... **ROCKWELL-STANDARD CORPORATION**

Transmission and Axle Division, Detroit 32, Michigan

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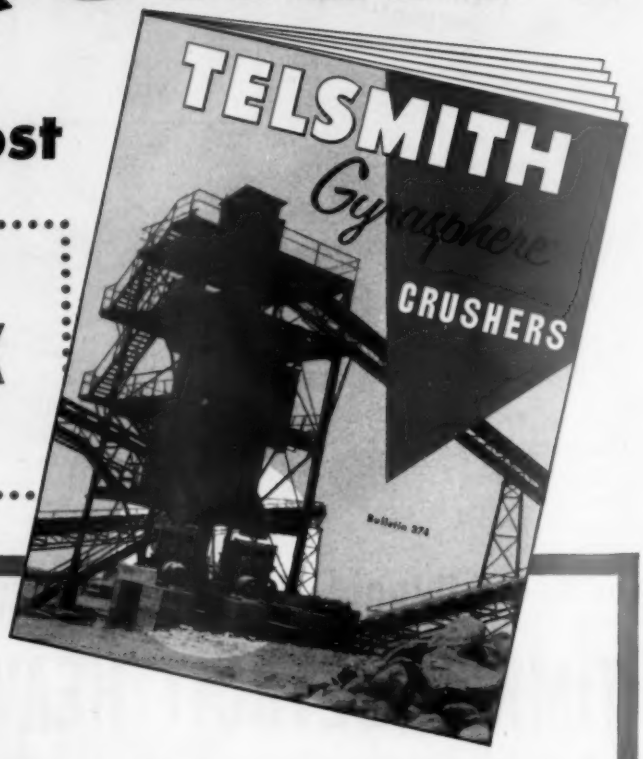
Aggregates at Lowest Cost

Get this
NEW BOOK
it tells how



TELSMITH Gyrasphere® the SECONDARY CRUSHER

Y-18-759

with 4-way superiority

Your secondary crusher, coarse or fine, must be easy to feed . . . turn out highest capacity . . . meet today's strict specifications. Get all this with modern Telsmith Gyraspheres, plus low power needs and low cost upkeep that gives you *lowest cost per ton*—for more and better aggregate at a greater profit. *How?* . . . get Bulletin 274.

NOW MADE IN FOUR SIZES—
24", 36", 48", and the NEW 66"
. . . for Coarse and Fine Crushing

SMITH ENGINEERING WORKS

508 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • **Cable Address: Sengworks, Milwaukee**

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(Continued from page 38)

Kaiser enlarges plans for Hawaiian aggregates plants

HENRY J. KAISER recently announced purchase of more ships for excavating and hauling construction materials or equipment, plus a 150-ton floating crane, for his growing Hawaiian construction operations. The crane, two Landing Ship Mediums (LSM) and one or more Landing Ship Tanks (LST), are in addition to his recent purchase of a million-dollar floating dredge plant, barges, tug and other marine construction equipment.

Mr. Kaiser said the equipment would be used to make aggregates available more widely and more cheaply than previously, just as his cement plant now being built should do. (He also told the press that a series of portable plants would soon be announced.) All this floating equipment should lower construction costs in Hawaii, and so encourage building, he said.

Swedish technique speeds earth-rock blasting

A STEEL TUBE equipped with circular crown bit is enabling a Swedish construction firm to blast both rock and its earth cover without removing the earth first. Very useful in speeding large excavating jobs, the Lindo Method uses the steel tube to prevent loose matter from caving in when the bit is removed. The drill steel protrudes about an inch from the tube and works in conjunction with it until the latter has penetrated into the rock (perhaps 4 in.) and has got a good grip. Then the tube is disconnected from the drill, and the inner bit continues boring to the desired depth in the rock. When the bit is withdrawn, the tube constitutes the connection between the rock and the ground level. (Usually, to save the cost of an expensive steel tube and its crown, it is replaced by a plastic tube before blasting.)

The technique was developed by four firms: the contractors on a big harbor excavation job at Norrkoping, AB Skanska Cementgjuteriet; Atlas Copco, Swedish maker of compressors and drills; the Sandvik works, maker of bits and crowns; and Nitroglycerin AB, which worked out charging and blasting details. The new Lindo Method was evolved to obviate the danger of wet clay and earth caving in on the slopes on the Norrkoping job, that might have occurred if conventional excavation methods had been used.

(Continued on page 44)

OWEN BUCKETS

new center line reeving doubles cable life

"Our new OWEN Bucket is great. That new center line reeving more than doubles our cable life," says Kenneth Muster, Supt. for R. F. Muntz, owner of the Hugo Sand and Gravel Co. of Kent, Ohio.

The tandem positioning of the lower closing sheaves permits the closing line lead to pass directly through the center of the head of the bucket. This exclusive OWEN feature eliminates excessive bending of the cable, resulting in increased cable life experienced by Hugo Sand and Gravel. It also permits the bucket to hang plumb from the crane boom.

This OWEN Clamshell, with all moving parts lubricated . . . with all arm and sheave pins, plus the main shaft, having triple lip grease seals . . . has heavily cut the high maintenance expense of handling this sand suspended in water that comes directly from the wash plant.

"Our operation is tough on a clamshell, but all these improved OWEN features have greatly reduced our maintenance costs and cut down-time," claims Mr. Muster.

Send us your requirements.
OWEN Engineers are at your service at all times.

The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO
BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

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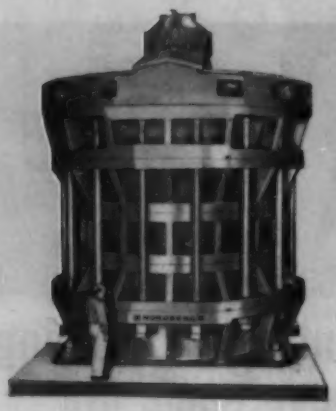
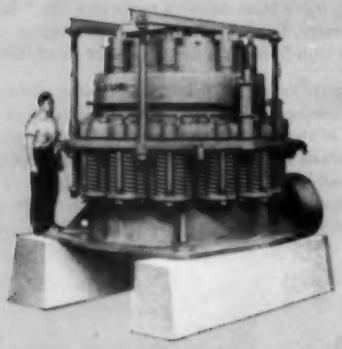


SYMONS® PRIMARY GYRATORY CRUSHERS

These gyratory crushers are built for big tonnage, heavy duty primary breaking in 30", 42", 48", 54", 60" and 72" feed opening sizes, for capacities up to 3600 or more tons per hour.

SYMONS INTERMEDIATE CONE CRUSHERS

General duty machines for producing large quantities of product material with a minimum of fines, from fairly uniform feed, requiring a reduction of only one or two sizes. Available with 22" and 30" crushing heads, in capacities to 100 tons per hour.

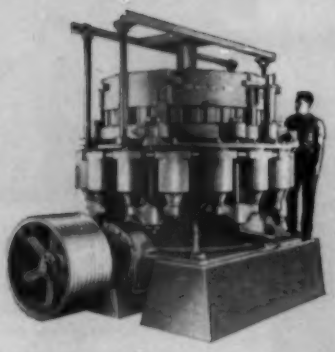


SYMONS CONE CRUSHERS

For secondary and finer reductions, Symons Cone Crushers, in both Standard and Short Head types, are built in sizes ranging from 22" to 7' in diameter, for capacities from 6 to 900 or more tons per hour.

NORDBERG GRINDING MILLS KILNS AND COOLERS

To meet specified conditions for wet or dry processing in the manufacture of cement and numerous other processes where friable material must be comminuted to fine sizes. Mills include Rod, Ball, Pebble, Tube and Compartment types in sizes from 6' to 13' diameter and up to 50' in length.



NORDBERG GYRADISC® CRUSHERS

Built to supplement the world-renowned Symons Cone Crushers, the Nordberg Gyradisc provides a medium for the profitable production of sand sizes of specification material.

NORDBERG ENGINES

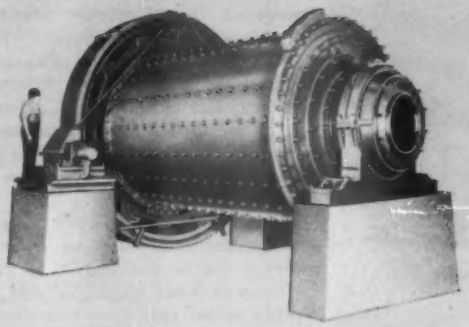
Ranging from small "packaged" power units to large stationary engines for base load and standby power, Nordberg engines are built in a wide range of types for Diesel, Duafuel® and Spark-ignition Gas operation, in sizes to over 11,000 horsepower.

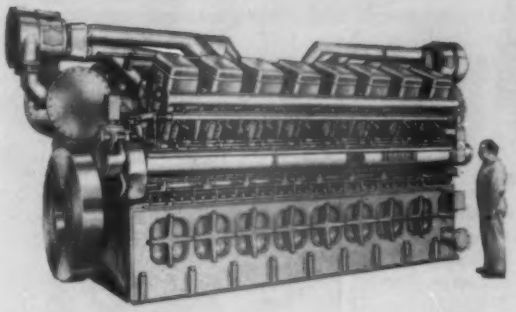
IN PORTABLE PLANT SERVICE

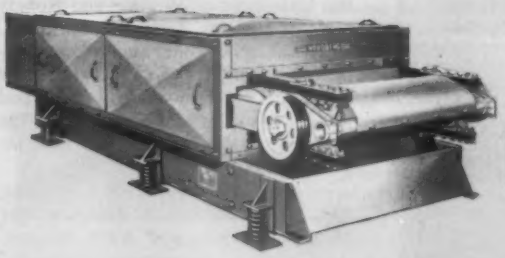
Increasing numbers of portable plant operators are now using Symons Cone Crushers for big capacity of fine product . . . such as this Cedarapids® portable intermediate crushing plant utilizing a 4' Symons Cone Crusher.

SYMONS VIBRATING SCREENS AND GRIZZLIES

Built in a wide range of types and sizes to meet practically all sizing requirements from heavy duty primary scalping to many fine screening applications.







For the Construction Projects of the World

NORDBERG MACHINERY

produces BIG TONNAGES of Specification Aggregate Bituminous Materials Crushed Sand and Cement

NOW—more than ever before—as you plan production to meet steadily increasing demands for big tonnages of specification aggregate, bituminous materials, crushed sand, and cement—*your best buy is Nordberg*. Here is machinery that is used throughout the cement, aggregate and construction industries for maximum, continuous production at lowest possible cost.

With dependability proved through use, Nordberg machinery is on the job wherever in the world leading producers and contractors are engaged in the construction of highways, dams and hydro projects, bridges, as well as commercial and residential buildings.

Whether you are a contractor, operator, construction superintendent or design engineer, you will find it profitable to specify and use Nordberg Crushing, Screening and Grinding Machinery for stationary and/or portable service.

NORDBERG MFG., Milwaukee 1, Wisconsin

SYMONS . . . a registered Nordberg trademark known throughout the world.

NORDBERG

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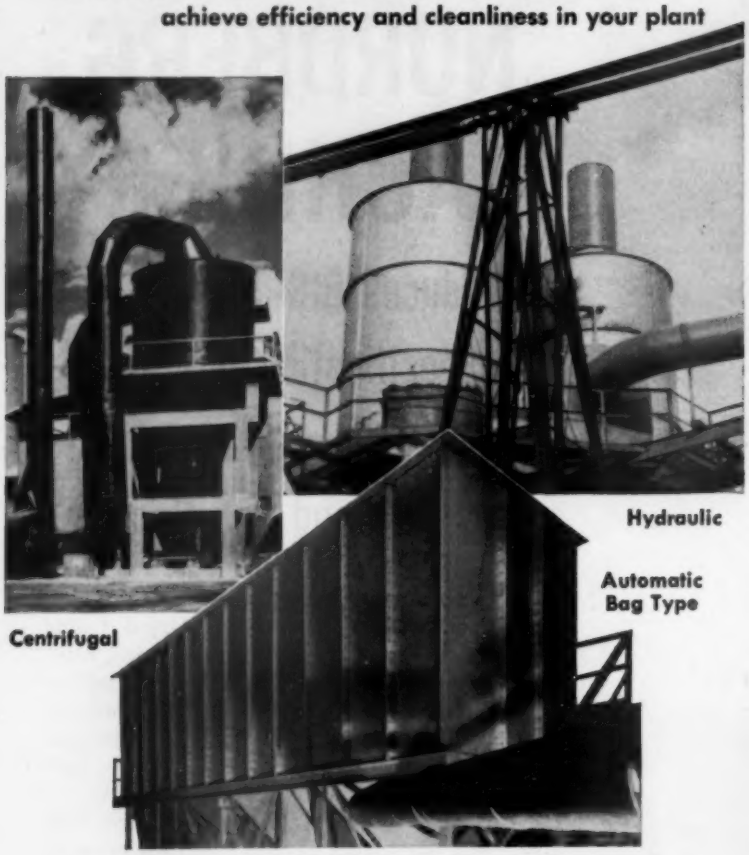
Get rid of dust!

It's expensive!

Norblo Dust and Fume Collection helps you achieve efficiency and cleanliness in your plant



Centrifugal

Hydraulic

Automatic Bag Type

Any dust or fume condition can slow down employee performance, increase spoilage and industrial accidents. All of which costs money — and *increased operating and maintenance costs.* Norblo helps you to achieve outstanding efficiency in dust and fume collection — helps you to avoid these costly factors economically.

Norblo's valuable experience of almost 50 years in three principal dust collection methods is widely recognized in industry. The Norblo patented Centrifugal system is often installed in combination with the Norblo Hydraulic Collector or Norblo Bag Type Collector — the most imitated *automatic* bag type dust arrester.

High recovery with low operating and maintenance costs is the record of Norblo dust and fume collection installations. Ask your consultant, or write direct for information about Norblo *guaranteed* performance.

The Northern Blower Company

6408 Barberton Ave. • OLympic 1-1300 • Cleveland 3, Ohio

Norblo ENGINEERED DUST COLLECTION SYSTEMS FOR ALL INDUSTRIES

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(Continued from page 41)

A-M buys Concrete Materials

AMERICAN-MARIETTA CO. announced August 11 the acquisition of Concrete Materials & Construction Co., Cedar Rapids, Iowa, and its affiliate, Concrete Materials Co. From plants in Iowa, Kansas and Missouri, the company supplied 6 million tons of crushed stone, sand and gravel in 1958. The 23-year old firm has 600 employes.

This marks A-M's second big step into the aggregates business, the first being its acquisition earlier this year of Superior Stone Co., Raleigh, N.C.

A-M chairman Grover M. Hermann announced that Concrete Materials will operate as an independent division of his firm. Continuing as officers are Fred E. Bellamy, president, Sidney P. Moore, chairman, and K. K. Kinsey, vice president and general manager. There also will be no changes in personnel or facilities, Mr. Hermann announced.

Concrete Materials pioneered in the development and use of portable crushing plants, enabling it to move far from its home states. Notable jobs of this nature are the production of aggregates for the Kansas and Pennsylvania turnpikes, the Alcan Highway, and for concrete pipe and dams built to supply Caracas, Venezuela, with water.

Kroskin and Karn win Solite design awards

WINNERS OF THE SIXTH ANNUAL Solite Competition Award, given for the best designs using Solite lightweight aggregate in concrete block and structural concrete, are Irvin Kroskin of the University of Virginia and Robert Karn of Virginia Polytechnic Institute.

They and six other seniors are winners of contests held at the two schools. The eight share $1,500 and a free trip to the annual meeting of the Virginia Chapter of the American Institute of Architects.

Winners at VPI are, left to right, Robert Karn, second place winner Donald Blevins, and John Hunton, third prize.

(Continued on page 46)

COMPARE THE NEW
EIMCO 123
FRONT END LOADER! CHECK THE

FACTS

NOT THE CLAIMS

	EIMCO 103	CAT D-4	CAT D-6	AC HD-6	AC HD-11	INT. TD-9	INT. TD-15	CASE 1000
Maximum Drawbar Pull, Pounds (zero track slippage)	33,600	20,700	19,000	15,485	21,980	13,240	23,750	24,000
Torque Converter	Yes	No	No	No	No	No	No	Yes
Master Clutch	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Power shift transmission on all speeds, with oil-cooled metallic clutches that never need adjustment	Yes	No	No	No	No	No	No	No
Independently reversible track	Yes	No	No	No	No	No	No	Yes
Hydraulic track take-up	Yes	No	No	No	No	No	No	Yes
Heat-treated alloy steel grouser shoes, keyed to the track links	Yes	No	No	No	No	No	No	No
One-piece heat-treated alloy steel track rollers, tapered roller bearings	Yes	No	No	No	No	No	No	No
Equalizer bar of heavy duty heat-treated cast alloy steel, allowing full oscillation of crawler tracks with all attachments	Yes	No	No	No	No	No	No	No
Constantly running power take-off drives front and rear, to standard SAE specs, with rear take-off not affected by track operation, and independent hydraulic pump drive allowing simultaneous use of hydraulic, winch and hoist accessories	Yes	No	No	No	No	No	No	No
Front operator's seat for full visibility	Yes	No	No	No	No	No	No	No
Ability to operate forward and backward on up to 90% slopes	Yes	No	No	No	No	No	No	No
Tractor guaranteed for one full year of single shift service	Yes	No	No	No	No	No	No	No

FOR PROOF OF EIMCO 123 SUPERIORITY

FRONT END LOADERS	EIMCO 123	CAT 955	CAT 977	AC HD8G	AC HD11G	INT. 9K3	INT. 15K3	CASE 1000
WEIGHT, POUNDS	25,000	22,470	34,915	19,600	32,000	19,985	33,235	21,800
ROCK BUCKET, CU. YARDS	1¾	1.1	1.8	1½	2¼	1½	2¼	N.A.
ENGINE HP	100	70	100	72	111	71	115	100
TRACK GAUGE, INCHES	60	60	74	60	74	60	74	60
SHOE WIDTH, INCHES	17	15	18	13	16	15	18	16
LENGTH OF TRACK, INCHES	88	81½	105 15/16	83 15/16	106¼	75	98½	79
TRACK AREA, SQ. INCHES	3,000	2,450	3,814	2,180	3,410	2,250	3,546	2,530
GROUND PRESSURE, PSI.	8.3	9.2	9.2	9.0	9.4	8.9	9.4	8.6
LIFT HEIGHT TO HINGE PIN, INCHES	144	128	144	120	139	125	144	134
DUMP HEIGHT, INCHES	115	100	114	98	114	102	113	101
DUMP REACH, INCHES	44	38½	39	31	37	26	37	40
MAX. DUMP ANGLE, DEGREES	63	50	50	45	52	60	58	50
MAX. PUMP PRESSURE, PSI	1,200	1,450	1,450	1,000	1,300	1,500	1,750	1,450
PUMP, GPM	75	43	52.5	39	72	N.A.	N.A.	50
LIFT TIME, SEC.	7.5	7.0	9.1	9.0	9.0	7.7	9.0	7.5
DUMP TIME, SEC.	3.0	4.0	5.0	4.0	4.0	N.A.	N.A.	1.6
GROUND CLEARANCE, INCHES	17	13 5/16	19¼	11⅜	13⅝	9	10	16

N.A. — not available

Information is from manufacturer's data and other sources believed to be reliable, but cannot be guaranteed.

IT'S A FACT . . . not a claim . . . that here is a MODERN line of tractors that makes all other crawler-tractors old-fashioned!

Other exclusive features includes Unitized "Stress Flow" Construction, for far greater strength and rigidity; Self-cleaning Air Cleaner that completely eliminates ordinary routine cleaner maintenance and others, far too numerous to list here. Write for details and specifications on all the advanced engineering features of the modern Eimco 103 line of crawler tractors.

AVAILABLE IN FOLLOWING MODELS:

103 — TRACTOR AND DOZER
123 — FRONT END LOADER
133 — STEEL MILL FEL
143 — LOG LOADER

"ADVANCED ENGINEERING AND QUALITY CRAFTSMANSHIP SINCE 1884"

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TRACTOR LOADER DIVISION
634 SOUTH 4TH WEST
SALT LAKE CITY, UTAH — U.S.A.

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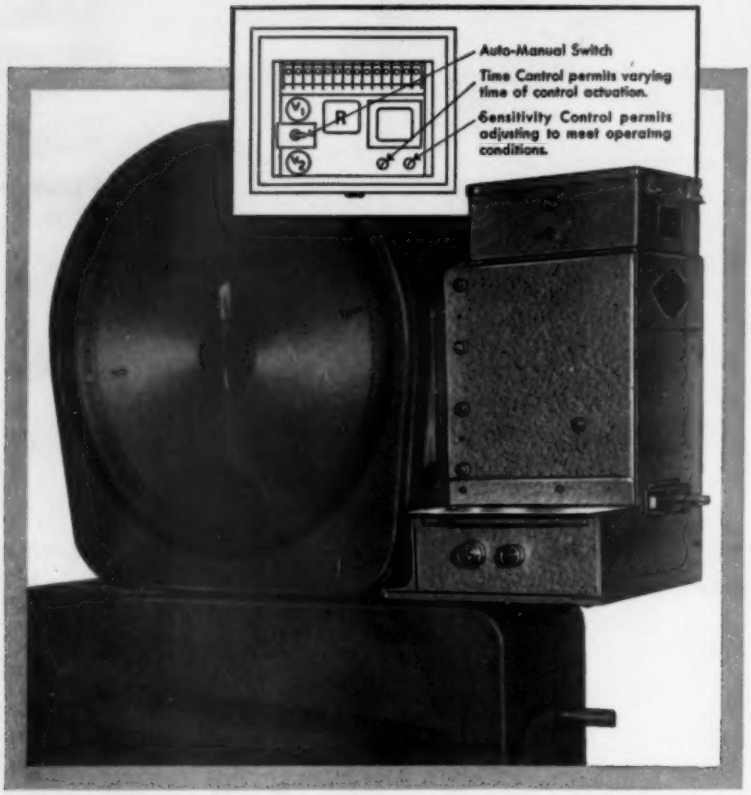
NEW Fairbanks-Morse Electronic Weight Detector


Auto-Manual Switch
Time Control permits varying time of control actuation.
Sensitivity Control permits adjusting to meet operating conditions.

Prevents incorrect weighing . . . stops costly errors!

With the new Electronic Weight Detector, true weight of any load can be automatically obtained and recorded without need of a weighman. Where a weighman is used, it is impossible for him to record incorrect weights or start a sequence at the wrong time. When desired, a flip of the switch can disengage the Weight Detector entirely from the system. *This is the first fully-reliable control of its kind available in the scale industry.*

To completely automate your weighing—to be sure that your weights are correct—to protect yourself by completely policing your entire weighing operation—contact your nearby Fairbanks-Morse Field Engineer, or write directly to Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago 5, Illinois for complete information.

See Sweet's Plant Engineering File for full line of F-M Scales

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL, DUAL FUEL AND GAS ENGINES • ELECTRIC MOTORS
GENERATORS • COMPRESSORS • MAGNETOS • HOME WATER SYSTEMS

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(Continued from page 44)

Plans for new gypsum plants announced

THESE NEW GYPSUM PLANTS were announced recently: Kaiser Gypsum, Albuquerque, N.M.; Bestwall Gypsum, Blue Rapids, Kans. and New Orleans; and National Gypsum, one plant in California and two in Canada.

Kaiser plans to begin production by June, 1960 at a new $3½-million operation 42 mi. northeast of Albuquerque. The plant, set to produce about 120 million sq. ft. of board yearly, will be Kaiser's fourth. The three existing operations are at Long Beach and Antioch, Calif. and Seattle, Wash.

Bestwall's Blue Rapids plant is set for completion by next July, and the New Orleans plant, by June. The New Orleans operation will cost $5½ million and have capacity to produce 150 million sq. ft. of board yearly. The Blue Rapids plant, to cost at least $4 million, will replace the present plant there and have mine capacity doubled from the current level.

National Gypsum's three new plants are part of a new $125-million, five-year program of expansion and acquisition which is the most ambitious in the firm's history. The firm announced only that it would build three new gypsum plants—"one in California, opening the West Coast to our products, plus new plants to serve principal Canadian markets."

IMC celebrates its 50th birthday

INTERNATIONAL MINERALS and Chemical Corp. is using a traveling display of historical pictures on its growth, and adopting a special anniversary emblem as features of its 50th anniversary celebration.

The traveling display has pictures showing the mining methods of 1909, plus other memorabilia of the times—including a picture of Admiral Peary, who discovered the North Pole on April 6 of that year.

IMC's new emblem is six-sided, to represent the crystalline structure of minerals, and encloses a "tree of life" design in the center, to carry out the "minerals for growth" concept that is fundamental to the firm.

Growth of the firm is shown by the sales figures: about $5 million in 1909, and $104 million last year. Most of this growth of the 68-plant firm has come under Louis Ware.

(Continued on page 48)

Need grinding balls in a hurry?

CONTACT UNITED STATES STEEL! If all of a sudden you find you're caught short on grinding balls, you can get them fast from United States Steel. For example, a West Virginia company needed 40,000 pounds of 2½-inch diameter USS Carbon-Manganese Grinding Balls in a hurry. They asked our Baltimore Office if the order could be shipped within two days after it was entered. We came to the aid of our customer and shipped his order *one day* after it was entered.

Though most companies place orders for grinding balls two to three months in advance, there are always emergencies . . . and United States Steel is ready to help you out when that emergency comes up. A complete stock of USS Carbon-Manganese Steel and USS Alloy Steel Grinding Balls is maintained at all times.

We can ship grinding balls almost any way you like: In 100-pound capacity burlap bags; in 2,000-pound capacity steel drums; in semi-trailer or dump trucks; in gondola or box cars (loose or in containers); or you can send your own truck if you like. The next time you need grinding balls contact the United States Steel Sales Office nearest you, or write or call United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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HAYWARD CLAMSHELL BUCKETS

WORK LONGER, WORK FASTER, WEAR LESS!

Designed with rugged, one-piece alloy shells ... wide type, cast manganese steel cutting edges ... smooth shell interior for fast, capacity loads and easy discharge ... manganese bushings ... diagonal truss brace to keep shell in line ... has no side sway or back lash ... *plus many other cost-cutting design features!*

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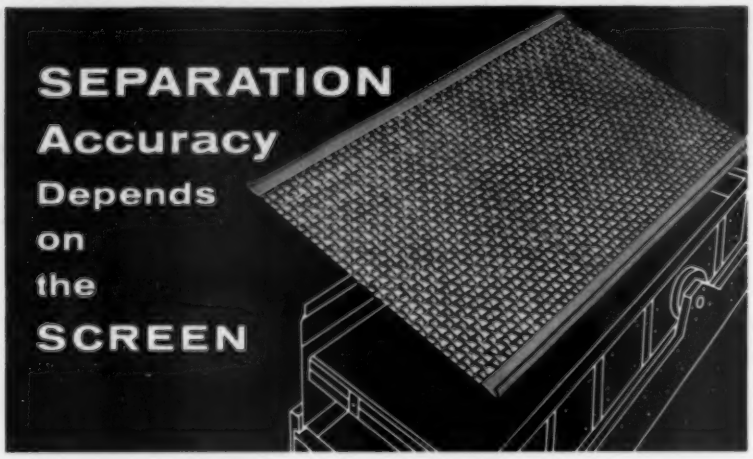

● Accurate separation of any vibrating equipment depends upon the screen. High tonnage, reduced blindness and extra strength are a result of careful screen selection. Cleveland's years of manufacturing experience provide a wide range of accurately sized weaves for long, trouble-free life. Available in Cleloy and all commercial metals for all types of mechanical and electrical vibrating equipment. Exclusive hooked edge design reduces bending, slipping and screen distortion.

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(Continued from page 46)

Rock products firms build new processing plants

AMONG THE NEW PLANTS announced by rock firms are these: 1) In its 1958 annual report, American Aggregates Corp. announces it has a new sand and gravel plant "projected" for the Detroit area. Last year the firm built sand and gravel plants at Newark, Lockbourne and Fairborn, Ohio.

2) Victorville Lime Rock Co., Victorville, Calif., plans to build a million-dollar plant in the Lucerne Valley, and will have it operating by spring. The quarry will be two miles distant and 2,000 ft. higher than the processing plant, general manager Elmer Piercy reports.

3) Oolite Minerals Corp., Cumberland City, Tenn., shipped the first carloads of dolomite from its new plant in this city in May. The plant is the first of several planned by the firm; others will be at Anderson, Dover and Stewart.

4) Planning is underway for a big new lightweight aggregate plant to be built by Great Western Aggregates Inc. The subsidiary of Ideal Cement Co. reportedly will erect the plant near Boulder, Colo. The one-kiln operation, to be the second operated by GWA, will have initial capacity of 300,000 cu. yd. annually. Planning for the 200-tph. plant, which is to have a 12 x 240-ft. kiln, is expected to be completed by October.

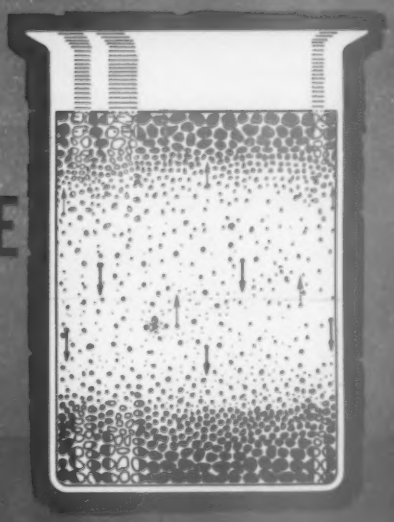
5) Another new rotary-kiln lightweight aggregate plant, located at Russel, Fla. (25 mi. southwest of Jacksonville), began production recently. Florida Solite Corp. is the first venture into this state by parent Southern Lightweight Aggregate Corp., though the firm operates three other plants in Virginia and North Carolina.

6) Two lightweight aggregate plants costing a total of a million dollars were announced by Cooksville-Laprairie Brick Ltd., Montreal. One, an entire new plant, will be completed sometime next year beside the firm's brick plant at Delson, Quebec. The other project, to be finished by this December, will add 50 percent to the firm's capacity at Cooksville, Que. The latter plant was built 30 years ago using the Hayde process, and was one of the world's first to produce Haydite.

7) Pozzolite, Inc. was set to begin construction in August of a $650,000 lightweight aggregate plant 15 mi. southeast of Deland, Fla.

(Continued on page 50)

THE WEMCO MOBIL-MILL PLUS WEMCO EXPERIENCE WILL GIVE YOU HIGH-VOLUME SPECIFICATION AGGREGATE AT LOW COST!



The heavy media separation process literally floats away undesirable shale, chert, clayballs, coal and other materials, produces volume, premium aggregate at low cost.

And the HMS equipment most often turned to for proved specification production is Wemco. Wemco's Mobil-Mill is the only pre-fabricated packaged plant backed by such long experience—nearly 20 years—with a record of over 150 installations. The Mobil-Mill is ready for on-the-site installation and operation without a break-in period.

Requires, in most cases, no additional labor, minimum supervision and maintenance.

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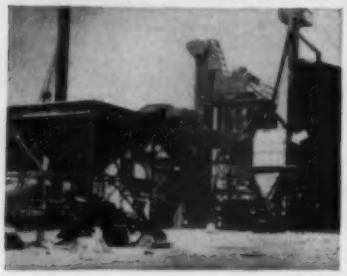

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ON STONE DRIER
—HIGH-EFFICIENCY COLLECTION
—NO MAINTENANCE COST!

This Dustex Miniature Cyclone Collector has been on the job at Rock Road Construction Co. in Chicago for five years, and a second Dustex, for four years.

"We have yet to spend any money for maintenance and repair," the firm reports. "You claimed high-efficiency collection and low maintenance costs. Your claims have been fully substantiated."

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of Dustex on your site, at no cost or obligation! Write for this Dustex Bulletin, "A Simplified Test Method."

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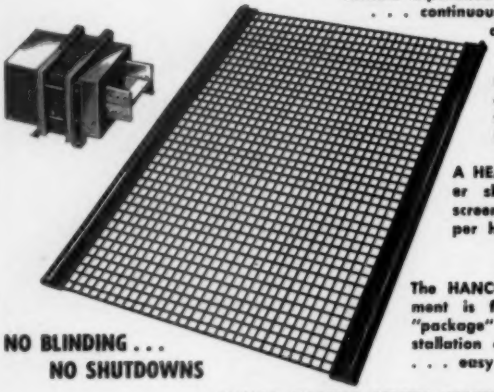

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The HANCO screen heating attachment is furnished as a complete "package" . . . an average installation consists of only 5 PARTS . . . easy and quick to install

NO BLINDING . . .
NO SHUTDOWNS

HANCO ELECTRIC SCREEN HEATERS are adaptable to virtually all woven screens and can be quickly attached to new or existing single or multiple-deck vibrating screen installations. HANCO models meet all capacity requirements and are ideal for heating either stainless or tempered steel cloth. Your inquiry will receive prompt and effective attention from our experienced engineers whose recommendations will assist you in increasing production and reducing screening costs.

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(Continued from page 48)

New Argentine plant to have biggest kiln

TOPPING NEWS of foreign cement firms is the announcement that a 610 ft. kiln, perhaps the world's largest, will be installed at a plant in Buenos Aires, Argentina. To be installed at the Barker cement plant of Loma Negra S. A. Compania Industrial Argentina, the kiln will have a "dumb-bell" cross section, with diameter of 17 ft. at the center and 18 ft. 6 in. at each end. The new kiln will add 11,700 bbl. per day to the plant's capacity. Allis-Chalmers Mfg. Co. is supplying the kiln, plus primary crusher, mills (including two for clinker grinding, 12 x 34 ft., which will have 2,500 hp. motors) and other equipment.

The cement industry of India has grown markedly from annual capacity of 2.1 million tons in 1944 to 6.4 million tons in 1958, the Association of Indian Trade and Industry reports. But it will have great difficulty reaching the 1961 goal of 12 million tons set by the second Five Year Plan, the group adds, because sharply raised excise duties have cut demand.

The Pakistan newspaper *Karachi Dawn* reports that the nation has a severe cement shortage which is hampering its growth under its own second Five Year Plan. While demand has averaged about 2.5 million tons a year recently, the Plan had set a goal for domestic production of only 1.3 million tons. Present capacity of about 1.03 million tons necessitates much importing of cement.

12 rock firms make *Fortune* list of top 500 industrials

THE FIRMS LISTED BELOW are the rock industry's contribution to *Fortune's* 1958 list of the top 500 U. S. industrial corporations. Some, like National Gypsum, Flintkote and Vulcan Materials, are growing very fast through acquisition of companies. Others, like Permanente and Ideal, are growing rapidly primarily by building their own new plants. The list:

	Rank 1958	Rank 1957	1958 sales (millions)
U.S. Gypsum	153	177	$266
National Gypsum	247	283	163
Flintkote	259	320	156
Fibreboard Paper Prod.	312	296	115
Material Service	315	355	114
Int'l. Minerals & Chem.	333	353	104
Vulcan Materials	342	388	101
Lone Star Cement	344	377	100
Ideal Cement	368	426	91
Ruberoid	396	416	83
Lehigh Portland Cement	427	467	76
Permanente Cement	467	—	67

(Continued on page 55)

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YARDS AHEAD

CURTISS-WRIGHT MODEL

226

CW-226 SELF-PROPELLED SCRAPER

Capacities: 26 cu. yds. struck, 36 cu. yds. heaped, 78,000 pound rated load

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Throughout the cycle — from the easy loading, through the high speed travel, to the fast dump, you're YARDS AHEAD with Curtiss-Wright scrapers. Designed and built to meet the skyrocketing production demands of today's construction industry, the CW-226 gives users a daily output unmatched by any competitive machine. See how the CW-226 can give your job a production boost — Let your C-W distributor give you complete details on the "Yards Ahead" features of the Curtiss-Wright line.

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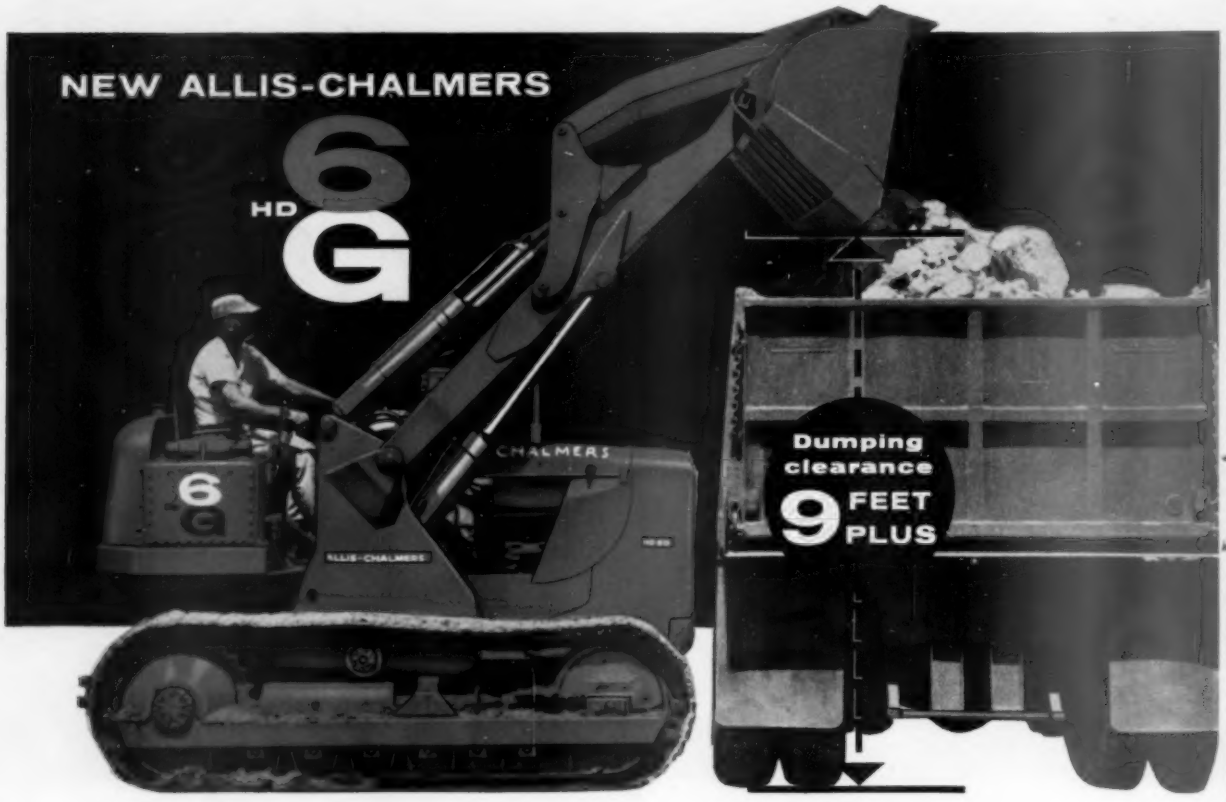
new slant in tractor shovels . . .
everything you need for

BIG PRODUCTION AT



What you want most in a 1½-yd tractor shovel is here. The new 6G gives you advanced-design features that mean extra productive ability you can *measure*—plus new comfort and convenience for the operator, servicing simplicity and big-tractor strength.

But this is only half the story. Your Allis-Chalmers dealer can tell you much, much more—and *prove* it, too! Why not let him set up a demonstration *now*, on your tractor shovel job? Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

Height with a bonus in reach

With as much as a foot more dumping height than the maximum for ordinary tractor shovels, the 6G reaches 'way out to dump over the center of big, sideboarded, 12-yd trucks. This height-and-reach combination pays off on other jobs, too—like stockpiling or loading out over the sides of excavations.

move ahead with ALLIS-CHALMERS AC . . .

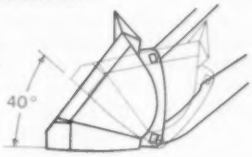
LOW COST

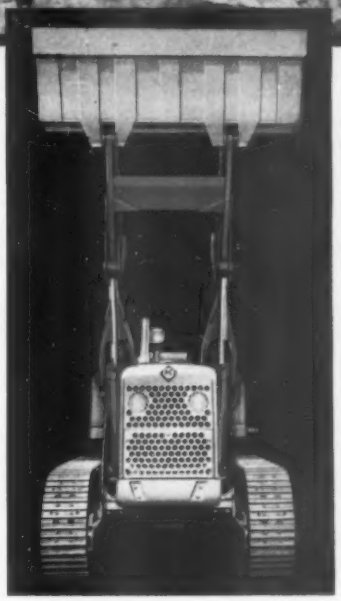
- 72 net engine hp
- 21,000 lb
- 1½-yd general purpose bucket
- 40° bucket tip-back
- Fast reverse to 4.1 mph
- Rugged "in-line" booms and linkage
- Best dump height, reach in its class

Super pry-out action

The new 6G's curved-bottom bucket puts a 10¾-ton force at the cutting edge. This unique "rolling-leverage" action is far more effective than the fixed, toe-and-heel principle of an ordinary, shoe-type bucket bottom. You can break out stubborn boulders, stumps and old pavement easily—get *full* loads *fast* in hardest materials.

Bucket tips back 40° on curved, box-section bottom.





Speed with stability and control

Shift from any forward speed to either reverse speed with a single lever—choose the *right* speed for every tractor shovel function. Powerful hydraulics put big loads right to the top, then bring the bucket down in a smooth, swift cycle. Nearly seven feet of track on the ground . . . positive, accurate controls . . . and new "down-slope" visibility let you handle the bucket and tractor with unheard-of balance and precision.

"In-line" strength

Booms and linkage are twin towers of solid-steel strength, straddle-mounted on wide-spaced pivots in the double-walled side frames. Lift and dump cylinders operate in exactly the same line, put dependable hydraulic power to work *straight from the shoulder.*

. . . power for a growing world

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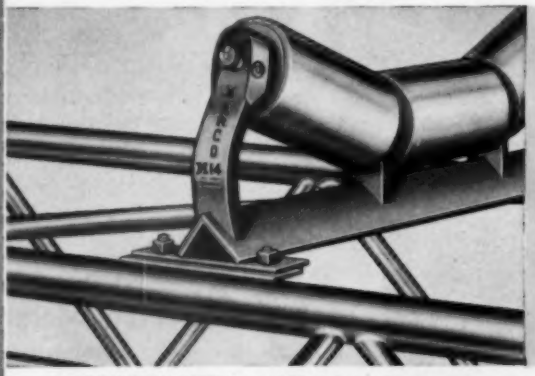
REDUCE BELT COSTS WITH MARCO TUBULAR FRAME CONVEYORS

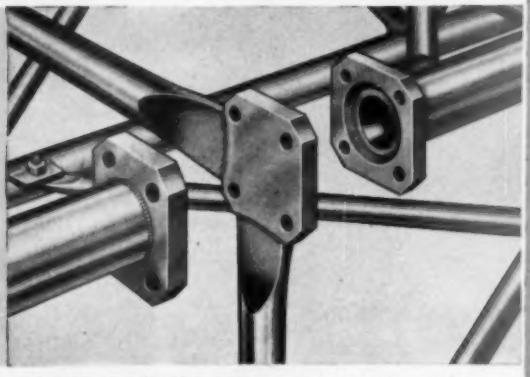
Exclusive conveyor features increase belt life by offering maximum protection against edge damage

WIDER FRAME—MARCO Tubular Frames are widest in the industry. They provide 100% more space (5½") in the critical area—between belt edge and nearest frame member. Pedestal type return idler brackets are used, instead of hanger brackets that confine and damage belt.

WIDER FACE PULLEYS—MARCO is first with modern pulley specifications. 2" between belt and pulley edge—provides 100% greater protection than outmoded standards. Reduces possibility of belt destruction caused by "belt wandering" in high tension areas.



ALL TUBULAR MEMBERS—MARCO Tubular Frames are more rigid. Constructed of the strongest known structural member, these frames are modern—and resist material and water build-up. Sharp "belt cutting" edges are eliminated with this exclusive construction.



RIGID JOINT CONSTRUCTION—Another MARCO exclusive—4 bolts in each connection—16 in each joint. Not the usual 1 or 2 per connection. Joints are more rigid. Resists frame misalignment, simplifying belt training and increasing belt life.

Now, more than ever, conveyor belt represents the largest major repair or replacement expense in a conveyor installation. Realizing the extreme importance of this fact, MARCO has designed every conceivable belt saving idea into its Tubular Frame Conveyors.

MARCO is first to have all 4 of these proven belt protection features: a wider frame, wider face pulleys, all tubular members and the most rigid joint construction.

If wind, uneven loading, or factors beyond control should cause "belt-wandering", this exclusive conveyor design offers the operator the finest, most complete protection against belt "edge damage".

Increasing belt life by reducing belt "edge damage" is only one of the cost saving advantages in MARCO Tubular Frame Conveyors. Remember, your conveyors are not mere plant accessories—they deserve the attention of a specialized manufacturer offering modern specifications, carefully and properly designed to meet your most exacting requirements. For more information consult your MARCO Distributor or contact E. F. Marsh Engineering Co., St. Louis 10, Missouri.

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Tubular Frame Belt Conveyors • Conveyor Idlers • Solid and Self Cleaning Steel Pulleys • Bucket Elevators • Control Gates • Feeders • Bins

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(Continued from page 50)

Aglime, limestone groups agree to merge

A VOTE OF MEMBERS of both the National Agricultural Limestone Institute and National Crushed Limestone Institute has resulted in merger of the two groups. Taken in June, the vote showed 119 of 136 in NALI favoring the move, and 63 of 64 in NCLI in favor. President Robert Koch noted that present officers will direct the groups until the Annual Meeting, to be held January 19 to 21, 1960, at the Mayflower Hotel, Washington, D.C. Mr. Koch also noted that the new National Limestone Institute Inc. "is not intended to have any basic differences of operation" from those followed by the two present groups.

But the merger will mean limestone producers will belong to a large, unified group which will carry more weight with federal and state officials (highway, farm and legislative) and with equipment manufacturers.

The important vote was taken following a meeting of the directors of both groups in Chicago June 8 and 9. Both boards favored the idea, and agreed to submit the proposal to a vote of the membership. Reportedly it will have more than 500 rock producer members making crushed limestone products.

A second important move by the group was its appointment of William W. Vicinus as engineer. A graduate civil engineer, Mr. Vicinus has a great deal of experience in the aggregate industries. He comes to the new Institute from a prominent consulting engineering firm in Chicago; previously he had been a consultant with several large manufacturing firms.

Volunteer Portland, Arrow Rock mergers make news

SUBJECT TO APPROVAL of Ideal Cement Co. stockholders, that firm planned to acquire at least 80 percent of the outstanding stock of Volunteer Portland Cement Co., Knoxville, Tenn. Volunteer's plant has annual capacity of about 3 million bbl. In effect, the deal will bring Ideal's annual capacity to 37 million bbl.; completion of the firm's plant near Albuquerque, N.M., in June had added another million barrels to the fast-growing total.

Ideal stockholders planned to meet July 28 to vote on a plan of reorganization, which would permit exchang-

(Continued on page 56)

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal—no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300%—special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

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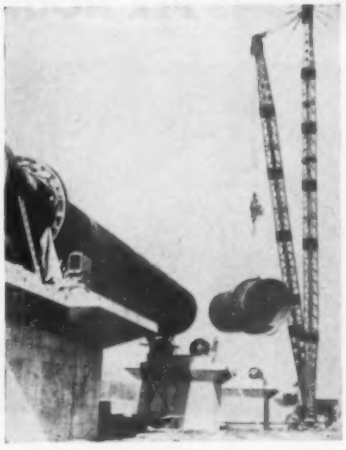

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MODIFYING AN OLD PLANT

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For bidding or appropriation estimates we have complete cost records for any of the above listed work. *Write, Phone,* or send Reader Service Card for full information:

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All things considered, BROOK A. C. MOTORS are best for powering crushers, screens, washers, apron feeders, and conveyors in sand and gravel pits and quarries. They are built for dependable, maintenance-free, all-weather service under severe conditions. Yet, they *cost less* than ordinary motors. 1 to 600 H.P. Warehouse stocks, factory representatives and dealers coast-to-coast. Send for literature.

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BROOK MOTOR CORPORATION

world's most respected motor

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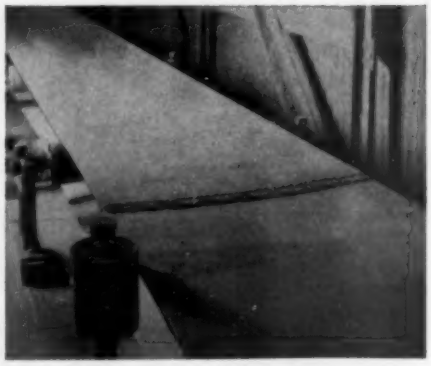
TOPS . . . functioning like new after 18 MONTHS AT 300 TONS PER HOUR!



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Solving tough problems in joining virtually any kind of belting has become an everyday occurrence with us. In brief, CRESCENT Belt Fasteners provide the fastest, most durable and most economical method of joining and repairing conveyor, elevator and transmission belting. Also, CRESCENT Rivets are self-piercing and self-clinching, thus no holes to align and bore. A hammer is the only tool required to execute any job.

A trial installation will verify the acknowledged fact that CRESCENT Belt Fasteners make belting give better service. Remember . . . our vast experience accumulated since 1897 is at your disposal without obligation. Get complete information today!

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INDUSTRY NEWS

(Continued from page 55)

ing 3⅜ Ideal shares for each Volunteer share.

Livingston Rock & Gravel Co., Arcadia, Calif., announces that it has acquired Arrow Rock Co., with plants at Duarte, Sun Valley and Chatsworth. Arrow makes ready-mixed concrete, sand and gravel. Livingston, affiliated with Triangle Rock Products, Inc., San Bernardino, operates nine production plants, 15 batch plants and two quarries in Los Angeles, Riverside, San Bernardino and Kern counties.

Murray Tile Co., Cloverport, Ky., has been acquired by National Gypsum Co., Buffalo, N.Y. An exchange of all Murray stock for 24,800 National shares (worth about $1.6 million recently) was announced. The firm will operate as a part of National's tile division, which includes the newly acquired American Encaustic Tiling Co., Lansdale, Pa., and Olean Tile Co., Olean, N.Y.

Safety programs pay—rock firms prove it

BE SAFETY CONSCIOUS. That this effort pays off is shown by two incidents reported to ROCK PRODUCTS. New York Trap Rock's Clinton Point workers recently received a $2,000 check from their employer for 700,000 man-hours without a lost-time accident, and the firm's Rockland County workers got $1,000 for no lost-time accidents in 100,000 man-hours. Safety programs pay employers, too. One block firm with fewer than 50 employes saved almost $35,000 in workmen's compensation premiums during nine years of an organized safety program, the National Concrete Masonry Association's "Safety Bulletin" reports.

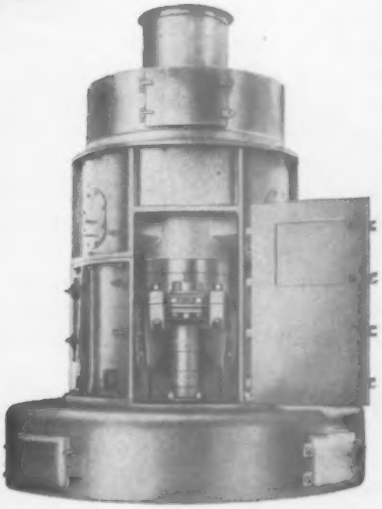
Sand and gravel producers please note: Members of NSGA have been sent forms on which to report their safety records for the year ending June 30, 1959. Because the cause is important and the benefits to both workers and employers great, all association members are requested to return the completed form.

The Thornton quarry of Chicago's Material Service Corp. and the Grand Rapids (Mich.) mine of Bestwall Gypsum Co. are the two rock industry winners of the important Sentinels of Safety competition cosponsored by the Bureau of Mines and *The Explosives Engineer* magazine. END

WHERE UNIFORM FINENESS IS DESIRED...
WHERE MINIMUM MAINTENANCE IS REQUIRED

The Bradley Pneumatic Hercules Mill provides uniform grinding of limestone, phosphate rock, etc. from 20 to 325 mesh. Its durable, non-clogging vibratory feeder practically eliminates manual feeding . . . allows continuous operation of the mill at its maximum capacity. And because the Bradley Pneumatic Mill is installed on a foundation flush with the floor line, it not only reduces foundation costs but simplifies inspection and maintenance. All grinding parts are also easy accessible . . . and both grinding die ring and roll assemblies can be removed without dismantling the mill. Add rugged construction to this, and you have a mill where dependable, uniform grinding is combined with an absolute minimum of replacements and downtime.

See Chemical Engineering Catalog or for complete information, write for Catalog No. 63



BRADLEY PNEUMATIC HERCULES MILLS

BRADLEY PULVERIZER CO.
superior grinding equipment since 1891

LONDON ALLENTOWN, PA. BOSTON

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Giant capacity with typical Mack performance advantages

NEW MACK 40-TON DUMPER

Mack's new LYSW Model is engineered and built to handle 40-ton loads of ore and rock with greatest performance and at lowest cost. Whether in strip mine or quarry service, this rugged addition to the Mack line brings traditional Mack performance to the most formidable hauling jobs. Operators net more tons per dollar because no other truck can match Mack's long operating prime of life under the most demanding conditions.

Powered by a 450 hp Cummins diesel engine, this 4-wheel-drive, 6-wheel end-dumper, with its 8-speed overgear transmission, air assist clutch, or optional torque-converter drive, has the ability to easily haul the biggest loads and at the same time provide unequalled handling ease and safety.

Mack quality shows up on the LYSW wherever you look. Axles and axle housings made by Mack are unmatched for sheer strength and durability. Mack-built transmissions are noted for dependable performance and long life because of their drop-forged, case-hardened gears and oversized shafts and bearings. Even the cab, with its heavy-duty all-steel welded construction bears the unmistakable stamp of Mack quality – as does the exclusive design of the driver's seat, unquestionably the finest offered for the man behind the wheel.

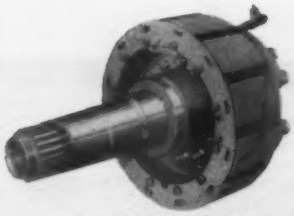
Let your Mack branch or distributor explain the many new and unique advantages of the LYSW Model. When you get the facts, you'll be convinced that an investment in a Mack makes sense from the start. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd., Toronto, Ont.

7140

MACK
FIRST NAME FOR
TRUCKS

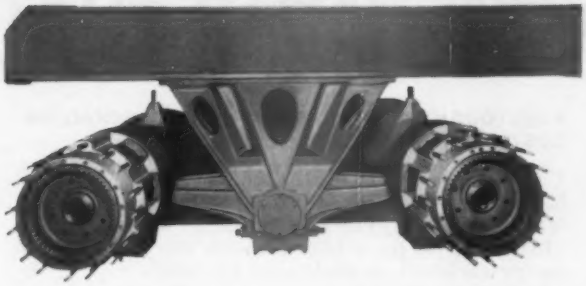
In grueling, long experience on the Mesabi Range, the new LYSW 40-tonner has responded easily to every demand made upon it... **SO MUCH SO, THAT THE DEMAND BY THE INDUSTRY FOR THE MACK LYSW HAS EXCEEDED ALL FORECASTS.**

Enter 1252 on Reader Card



New radial-type maximum contact brakes are of latest air-over-hydraulic aircraft-type design. Positive braking control regardless of load is provided by use of 12 equally spaced blocks on each brake, activated by simple, positive, self-equalizing air-hydraulic system. The air-hydraulic rotochambers for each wheel are mounted inside frame for complete and safe protection. A set of internal expanding air brakes on the front wheels and a powerful hand brake working against the drive shaft complete the LYSW's braking system.

New alloy-steel frame on the LYSW Model is **stress relieved.** This assures a minimum of localized stress concentration with an extra wide margin of safety. The frame is built with tremendous strength and endurance factors which enable it to handle the heaviest loads and, at the same time, shrug off shock and vibration. I-beam side rails of heat-treated alloy steel have exceptional strength and stiffness (section modulus of 138), and the massive X-construction over the bogie ensures freedom from bending, wracking and twisting.



Newly designed Mack Balanced Bogie on the LYSW offers the strength and simplicity of straight-through drive and single-reduction carriers with Mack Planidrive reduction in the hubs. Exceptionally long tire life is achieved through unusual bogie flexibility which also reduces twisting and wracking of the frame. Even with diagonally opposite wheels raised more than a foot each, this flexibility keeps all wheels equally loaded and the frame level as shown. Mack's exclusive walking-beam suspension results in longer spring life by relieving springs of shock loads. And Mack's exclusive Power Divider directs power to the wheels having traction.

CLUPAK EXTENSIBLE KRAFT PAPER

ORDINARY KRAFT PAPER

DISCOVERY OPENS NEW ERA FOR PAPER

NOW, PAPER THAT

DROPPED CAN crashes through ordinary paper which lacks stretch, but bounces off CLUPAK paper of equal basis weight. Unlike creped paper which stretches easily, every fiber of CLUPAK paper resists as it stretches.

NEW TOUGHNESS, FLEXIBILITY CUTS PACKAGING COSTS, INSPIRES NEW PRODUCTS.

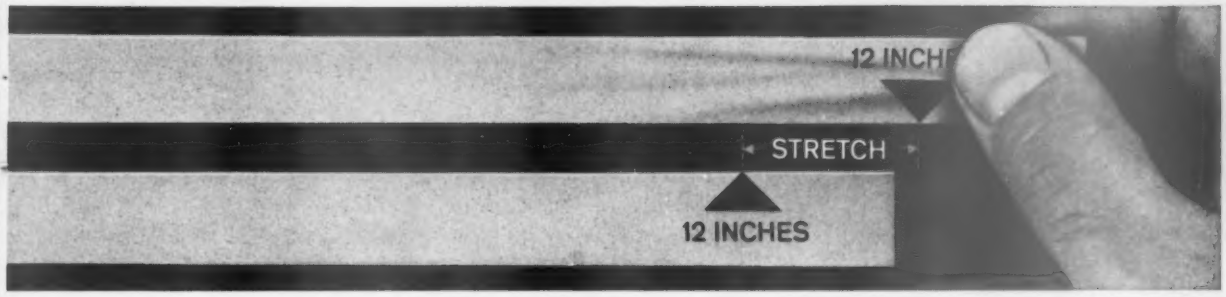
Until the invention of CLUPAK Extensible Paper, paper has just been strong. It resisted the energy of impact until it ripped or tore. But now paper can also be *tough*. CLUPAK paper has a built-in stretch that lets it absorb energy that otherwise would cause it to break.

Because CLUPAK can be almost any type or basis weight

MULTIWALL SACKS perform strikingly better when made with CLUPAK paper. Bottom sacks here carry 6,000 pound weight without failing, resist roughest handling. Basis weight can often be reduced substantially, cutting sack cost.

GROCERY BAG of ordinary kraft splits, spills contents after drop, but the much tougher CLUPAK paper bag absorbs shock, remains intact.

STACK COMPARISON shows how CLUPAK flexibility enables multiwall sacks to fill better, for many products, saving up to 25% of space needed for storage and shipping.



STRETCHES

of paper, with varying controllable degrees of stretch, it transforms conventional paper into virtually a new material—one with almost unlimited possibilities.

CLUPAK stretch is already giving multiwall sacks, grocery bags, magazine wrappers, paper-base pipe and laminates, shipping containers and many other products spectacularly better performance and lower costs. And the flexibility of CLUPAK papers can also mean startling savings and advantages in many uses and situations.

But these applications of CLUPAK Extensible Paper are only the beginning. CLUPAK is the most exciting new word in paper. The "give" it adds to paper opens a new era, invites a thousand new products and design improvements. We suggest you investigate the potential of CLUPAK for your business. It will pay you to consult your paper supplier. Our licensees, who make CLUPAK paper, are listed below. ***Clupak, Inc., 530 Fifth Avenue, New York 36, N. Y.***

UNIQUE TEST machine measures and graphs far greater toughness of CLUPAK paper. Printability, surface friction, porosity and other properties of CLUPAK paper can be controlled as with conventional paper.

KEY FACTS FOR BUYERS

1. CLUPAK kraft is the same as ordinary kraft except that it is stronger, tougher and more flexible. Its built-in stretch accommodates strains that break ordinary kraft.
2. This increased toughness, for example, allows multiwall sack users to increase strength yet decrease the number of plies with resulting economies.
3. CLUPAK, INC. conducts research and development activities and advises licensees on technical matters.
4. CLUPAK, INC. permits the use of its trademark only on paper which meets this company's rigid toughness requirements.

TRADEMARK "CLUPAK" is your assurance that paper will deliver remarkable CLUPAK benefits. Look for it, expect it.

BE SURE TO LOOK FOR THIS TRADEMARK

EXTENSIBLE **CLUPAK®** PAPER*

*Clupak, Inc.'s trademark for extensible paper manufactured under its authority.

You can now get CLUPAK paper and products made with CLUPAK paper from

ALBEMARLE PAPER MANUFACTURING CO.
CALCASIEU PAPER CO.
CANADA PAPER CO. *(Canada)*
CROWN ZELLERBACH CORP.
CONTINENTAL CAN COMPANY, INC.
DYNÄS AKTIEBOLAG *(Sweden)*
HUDSON PULP AND PAPER CORP.
INTERNATIONAL PAPER CO.
ST. LAWRENCE CORP., LTD. *(Canada)*
ST. REGIS PAPER CO.
UNION BAG-CAMP PAPER CORP.
WEST VIRGINIA PULP AND PAPER CO.

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HEADQUARTERS FOR YOUR BEST BUYS IN USED EQUIPMENT!

Your Caterpillar Dealer's lot holds the best selection of used earthmoving equipment buys on the market. Here's why: His business is active—and he reconditions, classifies and guarantees his trade-ins so you *know* what you're getting. Here's how:

1 **A "BONDED BUY"** on used Cat-built equipment is your safest buy. It's a bonded guarantee, up to $10,000 of satisfactory performance on *all* parts during the guarantee period.

2 **A "CERTIFIED BUY"** covers units of any make in good condition. This type of protection carries your dealer's written guarantee of satisfactory performance.

3 **A "BUY AND TRY"** deal is just what its name implies. This protects you with your dealer's written money-back agreement.

Only Caterpillar Dealers offer this protection. You'll find your dealer listed in the Yellow Pages. For your best buys in used equipment, visit his lot today!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BEST BUYS IN NEW AND USED EQUIPMENT

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CALENDAR

OF COMING EVENTS

1959

September 14-17, 1959
American Mining Congress, Convention, Metal Mining & Industrial Minerals, Denver, Colo.

September 23-26, 1959
Society of Mining Engineers/American Institute of Mechanical Engineers, Joint Meeting of Coal & Industrial Divs., Bedford Springs Hotel, Bedford Springs, Pa.

September 27-30, 1959
National Sand & Gravel Association, Semi-Annual Meeting, Board of Directors, Lake Placid Club, Lake Placid, N.Y.

October 1-3, 1959
National Lime Association, Operators Meeting, Sheraton Hotel, Phila., Pa.

October 8-10, 1959
Exploratory Drilling Symposium, Pennsylvania State University, University Park (College Park), Pennsylvania

October 11-16, 1959
American Society for Testing Materials, Third Pacific Area National Meeting, Sheraton Palace Hotel, San Francisco, Calif.

October 19-23, 1959
National Safety Council, annual Safety Congress and Exposition, industrial safety sessions at Conrad Hilton Hotel, Chicago

October 29-30, 1959
National Slag Association, Annual Meeting, Boca Raton Hotel, Boca Raton, Florida

1960

January 18-21, 1960
American Road Builders Association, Annual Convention, Netherland Hilton Hotel, Cincinnati, Ohio

January 19-21, 1960
National Limestone Institute, first annual meeting, Mayflower Hotel, Washington, D.C.

January 24-28, 1960
Associated Equipment Distributors, Annual Meeting, Conrad Hilton Hotel, Chicago

February 1-5, 1960
American Society for Testing Materials, Committee Week, Hotel Sherman, Chicago

February 15-19, 1960
National Sand & Gravel Association, Convention & Exposition, Conrad Hilton Hotel & Coliseum, Chicago

February 22-24, 1960
National Crushed Stone Association, Annual Convention & Exposition, Conrad Hilton Hotel, Chicago

June 26—July 1, 1960
ASTM annual meeting and apparatus exhibit, Chalfonte-Haddon Hall, Atlantic City, New Jersey

Enter 1209 on Reader Card

Cat DW21-PR21 units handle rock "on the double"

Increasing production is one of the soundest ways to cut quarry costs. Caterpillar DW21 Tractors with Athey PR21 Rear Dump Wagons were designed to help quarry operators do just that. Here's why:

They're big, rugged and an easy shovel target. They have a low center of gravity and are maneuverable.

The payoff of these features is in top production. For example, on the job pictured below, there were three Cat DW21-PR21s at work. The units were required to maneuver in limited room on benches and steep haul roads. Material included shot rock and sandstone. On haul lengths averaging 300 yards, the units handled 275 cu. yd. an hour.

New DW21 Series G now 345 HP

Now a new DW21 Series G is matched to the 22.5 cu. yd. PR21 for even faster production on the toughest jobs. Compared with the model it replaced, it has new HP—345 (maximum output) for an increase of 8%. It also has 12% higher rimpull. This increased rimpull provides up to 20% faster travel speeds under similar haul road conditions. Equally important, the horsepower increase was achieved without any sacrifice whatsoever in the excellent torque characteristics of the Cat Super-Turbo Engine.

Get the complete facts on the Cat DW21-PR21 from your Caterpillar Dealer. Ask for a demonstration. Pick a tough job—see for yourself how this giant handles the hard work!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

THE ONLY COMPLETE TRACTOR-TRAILER LINE... BY THE LEADERS

LOAD FAST! PR21 offers a big target. Short non-stop turns of DW21-PR21 unit speed spotting under shovel and work on a narrow bench. PR21's special steel withstands impact, abrasion and corrosion.

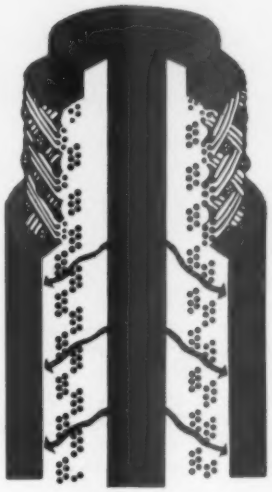
ROLL FAST! Two of three DW21-PR21 units on the job. DW21 combines high travel speed with excellent torque characteristics. The PR21 has a 22.5 cu. yd. heaped and 62,000 lb. capacity. All this adds up to fast cycles, top production.

DUMP FAST! PR21 has hydraulic hoists for quick and complete dumping of any material. DW21's hydraulic steering facilitates maneuvering. Wide-section, tubeless tires provide maximum flotation and sure traction.

R/M HOMOFLEX HOSE LASTS LONGEST on the toughest jobs

Homoflex Air Hose is the easiest handling hose made for use with air drills. Light, rugged and "flexible as a rope", it's engineered to take the beating of rough jobs . . . and last longer than any other hose. Homoflex Air Hose is mandrel-made with *no* pre-set twist. It coils and uncoils freely in any direction *without* kinking . . . without causing internal strain that can lead to hose rupture and hose failure! The exclusive Homoflex construction provides a homogeneous, inseparable tube-to-cover bond that further increases hose life. Uniform inside and outside diameters assure faster, easier, *safer* coupling . . . faster, fuller flow.

Homoflex Air Hose is also available for extra heavy duty and with yellow cover stripe for visibility; also in types for water, other fluids, and gases. Homoflex features result in lower costs for a wide range of job requirements. Let an R/M representative show you how you can get longer, trouble-free service—"More Use per Dollar"—with Homoflex Hose and other types of R/M hose.



ONLY R/M OFFERS

HOMOFLEX

CONSTRUCTION

More flexible and lighter than any other hose for equal pressure.

- SUPER-STRONG
- PRECISION BUILT
- FLEXIBLE AS A ROPE
- LIGHT WEIGHT

Note in cross section how specially designed braid permits the rubber tie-gum to penetrate and bond the braided plies during the plastic stage of vulcanization. This results in an inseparable tube-to-cover bond. Write for Bulletins M694 and M610.

"More Use per Dollar"

RAY-MAN CONVEYOR BELT TRAINS BETTER

Ray-Man has the extra flexibility to train naturally, trough easily . . . handle heavier loads. Cushioned strength members *plus* double compensation to relieve outer-ply stress—top *and* bottom—absorb load impact and greatly prolong belt life. Ray-Man really *holds* fasteners, is highly rip resistant . . . requires no breaker strip! Exclusive "XDC" Cover protects against wear, tear, cuts and abrasion. Check advantages of Ray-Man for your job . . . Other types include extra-cushioned Homocord for severe shock loading, and R/M Tension-Master for long lifts, high tensions. Write for Bulletin M302.

R/M POLY-V® DRIVE ELIMINATES BELT MATCHING

Single unit belt (*not* an assembly of V-belts), across full width of the drive-sheave eliminates belt "length-matching" problems. Equipment downtime and belt replacement costs are minimized. Patented Poly-V Drive has *twice* the tractive surface of a V-drive, and delivers up to 50% *more* power in the same space or *equal* power in as little as ⅔ *the space!* Just *two* cross sections of Poly-V Belt meet *every* heavy duty power transmission requirement. Greater power delivery and drive dependability begin when you specify R/M Poly-V* Drive for your mine fans and other equipment. Write for Bulletin M141.

*Poly-V is a registered Raybestos-Manhattan trademark.

RM614

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

RM

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HINTS & HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Which sign works best?

THE ONE ON THE LEFT, of course! What is so evident now, was not to the personnel of a mid-western cement plant. The battered old signs became fixtures which everyone ignored for years.

Safety-minded plant people designed a smart new red and white sign which commands attention when there is work overhead. To combat complacency which outmoded the old signs, the new ones have a separate piece which covers the "work overhead" part when the roof work is done. This is a black and white sign which merely commands, "Think." When this appears, everyone knows that the overhead work is done.

Polyethylene has arrived

ENTERPRISING ROCK PRODUCTS producers have discovered that polyethylene is a wonderfully useful and adaptable tool with which to solve many of their oldest and most difficult problems. With their usual ingenuity, they are using this material for many applications never dreamed of by the makers of this plastic material.

Polyethylene is available in many forms; some standard ones like flexible and stiff sheets are finding conventional uses to replace tarpaulins or plywood. Heavy films are used to cover piles of building materials, bags of portland cement and even piles of clinker at cement mills. Sheet materials have been used as substitutes for glass where it is desirable to admit light to construction areas or crusher buildings.

The plastic is available in many other forms, and these have been put to novel uses. One western sand and gravel operator found that a steel pipe needed replacement. Rather than dig up his 6-in. pipe he found that it was possible to make an adequate replacement by pushing a 4-in. polyethylene pipe right through the old system.

An eastern lime plant was having increasing difficulty with the steel pipe handling dust. Lime dust would adhere to the pipe, building up and eventually plugging the system. The perfect solution proved to be the substitution of plastic pipe. This pipe had and kept a smooth interior surface which did not permit lime fines to adhere and it was impervious to any possible corrosive effect.

Rubber-lined pumps

THE ABRASIVENESS OF SANDS is often so intense that very often the metal parts of centrifugal pumps wear out with startling rapidity. However, the same pumps, when rubber-lined, have handled thousands of tons of sand without appreciable wear.

This is the experience of an eastern

sand producer. He makes a milled sand in a rod mill with screen analysis of 100 percent through ⅜ in. and 90 to 100 percent through 4 mesh. Approximately 500 gpm. of water is necessary to convey about 35 tph. of material.

After producing about 100,000 tons of milled sand the pump was dismantled and inspected. The rubber lining was in excellent shape and the producer estimated that another 100,000 tons could easily be handled before wear became serious and replacement would be necessary.

Car haul safety

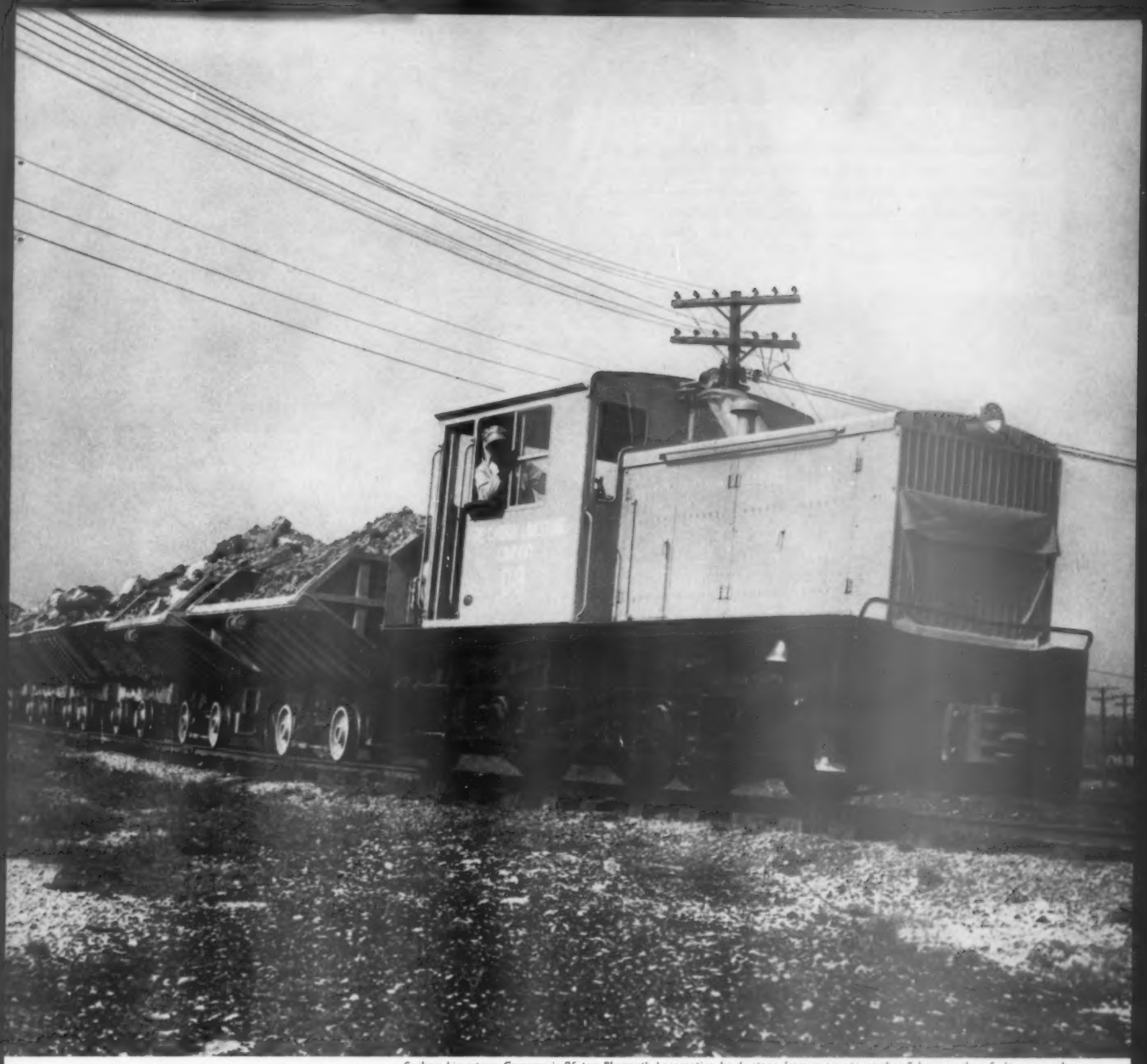
THERE'S NOTHING inherently unsafe with most capstan-type car pullers. However, there is always the possibility that an operator will try to pull more than the capacity of the machine by hooking a blocked car or one with the brakes set. If he should do this, it is possible that he could break the haul rope. A whip-

lash resulting from this could do serious damage.

Just the remote possibility was all that a cement producer needed to devise protection for car puller operators. Each capstan station was equipped with a heavy wire mesh screen, with wide enough mesh to give plenty of visibility, yet strong enough to protect the man.

(Continued on page 70)

Enter 1237 on Reader Card



Carbon Limestone Company's 25-ton Plymouth Locomotive hauls stone from quarry to crusher 8 hours a day, 5 days a week.

"Plymouth diesel saves us up to $1000 a year"

"A highly dependable and very economical piece of equipment," states George H. Donaldson, President of Carbon Limestone Company, Hillsville, Pa., in describing his company's Plymouth Locomotive.

This diesel-powered narrow-gauge model hauls 14 cars of limestone weighing up to 200 tons per load, over a 4-mile route from quarry to crusher under rough operating conditions. The unit is equipped with Torqomotive (hydraulic torque-converter) drive which provides smoother starts, eliminates stalling, reduces wear on bearings, gears, axles and engine. Specially designed for long life and trouble-free operation, Torqomotive drive automatically adjusts output horsepower (H.P.) to supply the exact amount of torque required for each change in operating conditions. "Teamed with Plymouth's other outstanding operating qualities," reports Mr. Donaldson, "it saves us up to $1000 a year."

For full information on a Plymouth designed to fit *your haulage needs*, send a brief outline of your operations to: The Fate-Root-Heath Company, Dept. A-5, Plymouth, Ohio.

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

RAIL POWER

PLYMOUTH LOCOMOTIVES in Progressive Industry throughout the world

Automatic hydraulic self-leveling bucket gives the operator a clear view with the International Wagner loader —unobstructed by cumbersome mechanical linkages. Big, ⅝-cu yd bucket is 64 inches wide, has 3,500-lb capacity. Notice how unsightly external hose connections are eliminated by T-340 internal pump design.

New International Drott Four-In-One. Only the new T-340 offers this versatile, high-production unit in the utility crawler field! Left below, showing exclusive clamshell action for "surrounding" materials, or dozing close to green foundations without excessive ground pressure. Right, bottom-dump action provides 9 ft, 6-inch under-bucket clearance. Also, use the Four-in-One as a regular bucket with ¾ cu yd (SAE struck) capacity; a scraper for inch-close grading accuracy; or a bulldozer with adjustable, radius-controlled moldboard for live, earth-rolling action. Parallelogram linkage holds bucket level from ground level to dump height.

already, they're calling it the

"terrific" T-340

New 45 hp* International Crawler leads its field in *POWER · SPEEDS · STEERING · EQUIPMENT!*

Reports from new T-340 users express amazement at its capacity . . . *its push and pull power*, compared with what they expected from a 31 drawbar hp rating. But when you measure the T-340 against its field, you see the reasons!

- **A quiet, smooth-running, 4-cylinder engine** with a proven pedigree for stamina and fuel economy.
- **Characteristic IH power-weight ratio,** delivering 95 per cent of the T-340's *built-in* operating weight of 5,600 lb as pull at the drawbar.
- **Job-matched speeds.** Only the T-340 in its power class offers Torque Amplifier Drive—providing *two* speeds in each of the five regular gears, letting you boost pull power up to 45 per cent, *on-the-go*, without declutching. Or, equip the T-340 with Fast Reverser, giving you *five reverse speeds*, each 22 per cent faster than the corresponding forward gear speed.
- **High-capacity, internal hydraulic pump,** gives instant-quick, fast-cycle equipment control.
- **Exclusive new planetary steering and final drive** —quick, easy pivot or "feathered" turns.

*Maximum flywheel hp

Measure the new T-340 by either price or performance . . . you'll quickly see why it's easily today's top value in the utility tractor field. See it *soon!*

Ask your IH Dealer to demonstrate . . . see for yourself how smooth, 4-cylinder power, planetary-type steering, balanced power-weight ratio and other features put the T-340 at the head of its class! For name of the IH dealer nearby, and descriptive literature, write International Harvester Company, Dept. AB-9, P. O. Box 7333, Chicago 80, Illinois, *today*.

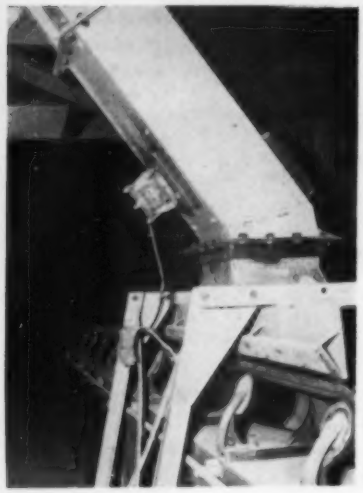
See Your
INTERNATIONAL HARVESTER Dealer

International Harvester Products pay for themselves in use —Farm Tractors and Equipment . . . Twine . . . Industrial Tractors and Equipment . . . Motor Trucks . . . Construction Equipment—General Office, Chicago 1, Illinois.

New International hydraulic bullgrader, is raised, lowered, tilted, and angled to right or left—all with fingertip hydraulic control. Blade is 85-inches wide and 25 inches high, plus a 7-inch center spillboard. Can be used in combination with scarifier, winch, and other rear-mounted equipment.

International Wagner Loader and backhoe can be mounted separately or in combination to form a highly efficient trenching, backfilling, and loading unit. Backhoe can be equipped with regular, molé's paw, bell hole, cemetery, or heavy-duty street repair bucket.

(Continued from page 66)



Chute vibrator

WHEN A SOUTHERN CEMENT maker started production recently he thought that there couldn't be any bugs in the design of the materials-handling equipment; every detail had been carefully engineered and double-checked.

But much to the chagrin of the plant engineer, a long, steep chute handling wet limestone plugged up almost immediately. Cement rock had enough fines to hang up, was damp enough to stick yet not wet enough to flow. The result was a huge callus inside the chute which eventually choked off the flow of material.

The quick solution was the installation of a vibrator at what appeared to be the most critical part of the chute. However, it is not the complete answer. An inspection door was installed to let the conveyor man look into the chute to make sure that a surge of fines does not overpower the vibrator.

Rubber-lagged screen plates

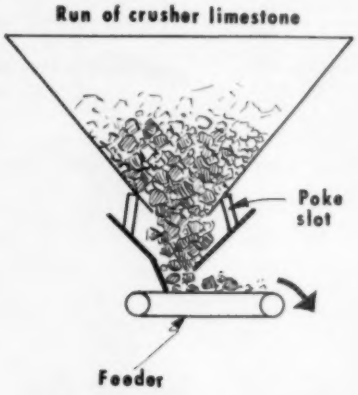
A EUROPEAN IRON MINE has developed a solution to its problem of rapid wear on screen plates in vibrating screens. The lumps of ore are very sharp and very heavy, and the process calls for a number of accurately sized grades. But the abrasive ore enlarged the holes in the perforated plates rapidly, even when abrasion resistant steels were used.

Sheets of perforated rubber were bonded to the steel plates with the openings in the rubber matching the openings in the plates. Additional lag screws were applied where the rubber showed any tendency to tear loose from the steel. The net result is that the life of the perforated plates was extended enormously, while the diameter of the perforated holes enlarged very slowly.

Built-in poke holes

ONE OF THE UNSIGHTLIEST parts of any rock products plant is around bins and hoppers where homemade poke holes have been cut. Very often this homemade remedy never really solves the problem of materials hanging up in the bins. The bins can be weakened seriously, and the accumulation of water and material on the working floor can be unsafe.

A southern cement plant's designers thought of this condition before the bins were designed. They almost had



to: The limestone was normally wet and sticky, and good housekeeping forbade unsightly accumulations of water and limestone on the floor. The design engineers nested a small hopper under the wide throat of the major storage bin, allowing about 6-in. clearance all around. The big bin supports the weight, the small one allows for inspection of the flow of material. The opening all around lets the operator poke to his heart's content.

Spreader for screen

EVERYONE LIKES horizontal vibrating screens. But the screens have the same problem of getting material spread across the width of the deck without taking up a lot of headroom. An eastern crushed stone producer found that a shallow box set into the head end of the vibrating screen helped this problem.

The box has a flanged lip which retards the flow of material enough to help spread it across the entire width of the plate. The solid plate prevents the crushed stone from wearing one section of the screen deck and improves screening efficiency at the same time.

Above the box which protects the screen is a straight chute. This prevents the stone from cascading over the flat plate directly to the screen. The chute is fitted with an inverted angle which also tends to spread the flow of stone. On the outside is a shelf to support a man's weight. The maintenance man can stand here when he inspects the motor takeup.

Water control

IT'S A LONG WAY from the control tower of this southern rock products producer's washing system to the sump. A compressed air line was more dependable than sending a man to shut off the discharge valve. It is now a simple matter to turn an air control valve and actuate the air cylinder which makes a prompt, foolproof closure of the discharge valve.

Downhill conveyor

MOST BELT CONVEYORS run horizontally or carry materials up inclines. But there are some that convey downhill, as does the one this Canadian cement company uses in its bagging building.

Since the bagging machines were on a floor high above the loading dock, a reliable, foolproof system was needed to bring the bags down for shipping. A belt conveyor proved to be the answer to the problem.

Of course, it's not an ordinary belt. It has a ribbed "gripper" surface that takes the multiwall bags of cement zipping down a polished steel chute and lowers them slowly and safely to the floor below. END

Enter 1200 on Reader Card

engine power BY CATERPILLAR

How Cat Diesel power pays off in industrial and mine locomotives

Today, not all industrial and mine locomotives have Caterpillar Diesel power. But the trend is definitely in that direction in locomotives up to and including 70-ton capacity. A locomotive assignment is no "bed of roses" for a diesel. That is why owners insist on the excellent productivity offered by Caterpillar. In both new locomotive purchases and in locomotive repowering jobs, men who demand more work from their diesels specify Caterpillar Diesel Engines.

If locomotives are a part of your production picture, these benefits of Cat power should be considered:

POWER RESERVE. Cat Engines deliver power needed to overcome adverse grades and bends. Their high torque rise and reasonable ratings will take heavy loads where "paper" horsepower is left behind.

WIDE RANGE OF FUELS. Cat Engines burn many fuels other diesels do not use. This non-premium appetite pays off in several ways: you can burn lower priced fuel . . . and you can burn heavier fuel (per gallon) with more resultant horsepower output.

FUEL BURNS COMPLETELY. The nonsensitive, foul-free Caterpillar-built fuel injection system gives complete fuel burning because of its precombustion chamber design. It transforms more of your fuel dollar to work and gives a clean exhaust that does not cloud up tunnels or foul up air underground. A variety of scrubbers, available for Cat Diesels, makes many of these engine arrangements permissible for use underground.

GOOD BREAKAWAY POWER. A Caterpillar Diesel-Torque Converter or Diesel Electric Drive enables a locomotive to break away large loads without an assist. This feature eliminates the high clutch costs on a direct drive installation. Most owners who have converted to these methods comment favorably on their advantages.

NEARBY PARTS AND SERVICE. Caterpillar Dealer Service facilities are available in all countries of the Free World—over 840 outlets place your Cat Diesel always near a parts and service source. This is why most manufacturers will offer Cat power when nearby parts and service are important factors.

HEAVY-DUTY DESIGN. The Cat Diesels that are offered for locomotive power are the same basic engines that have long been standards in the tough construction and mining industries.

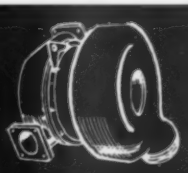
Caterpillar Tractor Co., Peoria, Ill., U. S. A.

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Caterpillar Dealers have cooperated closely with many large construction, mining and industrial companies on the solution to locomotive repowering problems. Your dealer will be glad to analyze your conditions and offer a repowering solution. For new equipment, contact your locomotive branch office or mail the coupon below.

Your Caterpillar Dealer Engine Specialist is your diesel power consultant. He's backed by quality parts, reasonably priced, and a skilled staff of factory-trained servicemen. Call him now to avoid problems later.

TURBOCHARGER — standard on most Cat Engines—gives more horsepower per pound of engine weight . . . improves efficiency by utilizing waste energy which reduces fuel consumption per horsepower-hour.



Dept. RP9, Engine Division
Caterpillar Tractor Co., Peoria, Illinois

Please have your representative get in touch with me and survey my locomotive power requirements. I am interested in diesel power for ☐ a new locomotive ☐ repowering an old locomotive. (If repowering, specify size of locomotive:_____)

Name_____

Company_____

Address_____

City_____ Zone____ State_____

How to reduce costs and increase profits

by Charles W. Ireland*

*Chairman of the Board, Vulcan Materials Co.

ROCK PRODUCTS
September 1959

If substantial cost reduction is to be gained, the major emphasis must be on improved productivity in the plant

THERE ARE MANY ASPECTS of the aggregate business which set it far apart from business in general. However, in striving for reduced costs and improved profits we find that the aggregate industry is no different than any other industry. For here there are the same universal requirements of continuing vigilance, constant emphasis and relentless search for ways and means to lower costs and improve profitability.

Nonetheless, as we explore the areas available to the aggregate producer for cost reduction, we begin to see that his problem is more complex than in many other industries. In reviewing the elements of cost one by one, it becomes obvious that in the aggregate plant there is not a sweeping opportunity to reduce operating costs by better purchase prices on raw materials; through significant reductions in direct labor costs resulting from incentive plans or increased output of the hourly employes; or by lowering overhead costs through improved material handling, better utilization of indirect labor and effective control of supplies, utilities and other operating expenses.

This is not intended to imply that these areas are not possible items of cost reduction in the aggregate business. Certainly, every producer should be striving to minimize the costs of handling raw materials (the stone in the ground); his direct labor costs should be held to the minimum essential to running the plant, and his overhead expenses should be subject to constant review and analysis. However, it is apparent that the savings here, while significant, are not always substantial and are frequently very difficult to realize.

Consequently, it is our opinion that if substantial cost reduction is to be gained, the major emphasis must be on improved productivity in the plant. A slight gain in output will produce far greater cost reduction at a faster rate than will long-range programs aimed at reducing direct costs and lowering operating expenses.

Just how do you go about improving productivity in an aggregate plant? Obviously, improved productivity means turning out more stone in the same operating time. The quickest and simplest way to accomplish this objective is to replace the equipment with new, modern facilities. But, the real test is to attain a better productivity with existing facilities or with low-cost revisions in the present plant. A program for improving output involves detailed analysis of each of the operating steps from the initial operation to the final stages of production. Follow the flow of the work through the plant and observe closely the rate of output at each step.

The next step is to carefully review the rate of operation at each phase and compare it against capacity. Where is the limiting rate and what is the bottleneck capacity? Is each phase operating close to capacity or is there one phase with a rate or capacity which is stifling productivity? If operating at a low rate, what measures can be taken to bring this step to capacity operation; or, if operating at capacity but still limiting production in the other phases, what can be done to improve the capacity of this particular operation? In this manner, by comparing rates of output and capacities, it may be determined where revisions must be made to provide a balanced flow of stone through the plant utilizing to the fullest practical extent the capacities of each of the operating steps.

In those situations where the analysis indicates an uneven interrupted flow of material, an investigation of the underlying causes is warranted. The delays and interruptions can be carefully detailed and analyzed to point out the reasons and contributing factors. Once known, it is possible to provide countermeasures to eliminate or minimize the difficulties which are resulting in a loss of productivity. Such measures might be preventive maintenance, proper equipment, trained operators and the like.

Thus, in summary, it may be said that if costs are to be reduced and profits increased, continuous effort must be made to reduce operating expenses and major emphasis should be directed toward increasing plant productivity. With operating crews and equipment properly balanced and with all other expenses in control, each gain in productivity of plant, slight as it may be, will be quickly reflected in the profit of the operation. END

It costs real money to get a better return from the use of men, machines and materials—but wise investment can, and has, paid off in greater return

AGGREGATE PRODUCERS INVEST FOR PROFIT

THE AGGREGATES INDUSTRY has made a strong move to improve operating efficiency, especially during the past couple of years. A big lesson learned by operators in the scramble to remain solvent is that it costs real money to get a better return from the use of men, machines and materials—but wise investment can, and has, paid off in higher profits. The need for improvement is increasing constantly, which compounds the problem. As one industrial engineer put it, "The trouble with trying to keep up with the Joneses is, just about the time you catch up with them, they refinance."

The aggregates industry reported in a ROCK PRODUCTS survey that there is a definite recognition of the problem. A minority of those reporting were specific in their methods of solution. Some are able to calculate and prove the economics of capital expenditures to improve efficiency. Others did not report because, we assume, of inconvenience in setting forth data, reluctance to report or for other causes. And quite a few frankly stated they didn't keep the data. Even though industry producers are burning the midnight oil to find solutions to the problem, it appears that there is a great need for a better understanding of how to engineer operation improvements.

Determination of costs is a requisite for efficient operation. Some operators do not keep enough cost records to know absolutely where to set a price that will return a profit. That's one extreme, and the result of this type of operation has to be disaster. But there are other successful operators who know to a fraction of a cent what every phase of their operation costs. They represent the other extreme.

But in between, there is every type of combination imaginable, according to our best information. Those "in-betweeners" and, of course, those who don't view costs with sufficient reverence, are in greatest need of help. What they apparently do not realize is that there is much help available, and they should take advantage of it.

The national associations that serve the aggregates industry have contributed greatly to the need for more information on that score. The National Crushed Stone Association has completed, after a most extensive study, an excellent guide called the "Accounting Manual for the Crushed Stone Industry." It frankly states in the introduction: "Companies that properly employ the tools of accounting to achieve financial control over operations have a decided advantage in attaining maximum efficiency of operations over their competitors who fail to use these tools."

Equally as important and just as effective are publications of the National Sand and Gravel Association. The association has formulated a cost accounting manual for both land and marine operations in the sand and gravel industry. Importance of the subject is shown by the final sentence in the foreword of these manuals: "The first element of good management is control of costs; without that, no company can be successful in an industry so highly competitive as ours."

These are only two direct industry sources that can be used in setting up systems of cost accounting. There are many others. The Machinery and Allied Products Institute has provided a system

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LOWER UNIT COST and improved product quality are goals to be realized through investment, if engineered and applied properly *(Photo, courtesy of Barber-Greene Co.)*

for analyzing all capital expenditures. This can be particularly valuable when considering the advisability of replacing worn or outmoded equipment.

Colleges, universities and financial associations also are in a position to help through publications on the subject. Then, not to be overlooked is the service ROCK PRODUCTS renders periodically through publication of articles on cost and related subjects.

Other efforts are being made to be as helpful as possible to the aggregates producer. For example, the National Sand and Gravel Association held a Controllers Conference in July that was productive of good information. That conference is reported elsewhere in this issue. A major factor unfolded at the meeting was the growing importance of the controller—the one who controls costs—to the business. A leading executive stated at that meeting that the controller probably was in a better position to inform management on the status of his present, and possible future business than any other company man.

Productivity rates are especially important in any scheme to improve operations costwise and profitwise. There are literally dozens of ways in which aggregates operators figure and report productivity rates, as our survey showed. These vary all the way from the simple tons of raw material processed per man-hour, to tons of saleable output per operating machine-hour. We found it hard to assemble enough rates of a single type, reported in the survey, to come close to what may be termed an industry average.

The primary use of a productivity rate in industry is to show progress or lack of it, regardless of how it is figured. Certainly, an improvement in productivity rate (based on the use of labor, which is common, or on the use of capital, which is not so common) tends to reduce cost of production. This assumes, of course, that factors other than that used as a base for computation remain the same (or improve to better the rate). (See ROCK PRODUCTS, September 1958, p. 92.)

The direct relation between a productivity rate and cost was explained neatly by Earl L. Petersen, chief industrial engineer for Paul Weir Co., Chicago, Ill. In an address before the American Mining Congress in Cleveland, Ohio, last May, his comments were to the coal industry, but are just as applicable to the aggregates industry. He said:

"During the past ten years, the coal industry, through the use of more efficient methods and machinery, has improved productivity over 70 percent. That in itself is commendable, but it does little good to gloat over it. At best, such improvement should only serve as an indication that more can be done, that new and still greater progress is possible.

"Necessity and competition between suppliers to the industry will force the periodic introduction of new equipment but, in many cases, existing equipment can be used more effectively—right now. Today's worker, too, can be much more productive. Cost reduction is a job that is never done. To stay in business, there can only be one answer. There must be an ever-active, well-defined program designed to exploit every available means to greater productivity and lower costs."

Industry productivity rates have received much attention during the past two years, specifically those in crushed stone. T. C. Cooke of Swampscott, Mass., headed an NCSA committee to exchange comparable productivity rates among producer members. In his second annual report on productivity, given at the 1959 annual meeting of the association, Mr. Cooke summed up: "I hope that this study will urge you toward greater efficiency. Labor saving machines and devices do pay off at today's high prices. Indeed, your rates of pay may rise faster than the cost of good equipment. If you are already doing a good job, you can make more money by further improving your efficiency. If you are near the bottom of this totem pole, you are in danger of being eliminated by competition."

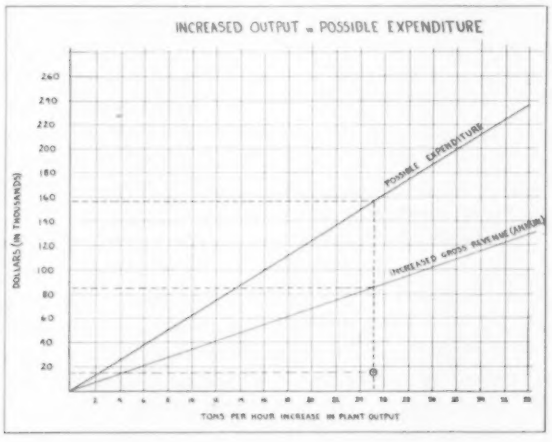
How does one approach the problem of improving effectiveness of machinery and the productivity rate, say on the basis of tons per man-hour? Our survey included a question, answers to which revealed an industry position. We asked: "How do you determine the need for capital expenditures to improve efficiency?" We think it is most encouraging that 60 percent of those replying stated their answer was by detailed cost analysis of the operation. Yet, relatively few were able to submit, or were willing to submit, specific information on calculated savings of newly installed equipment. Answers of the other 40 percent were divided almost equally between (1) comparing their operation with that of other producers, and (2) suggestions from equipment manufacturers or by others.

Of those who said they used the cost-analysis method, 33 percent relied on calculation of savings in labor and material. Nineteen percent based capital expenditures for efficiency on analysis of maintenance costs for specific pieces of equipment.

Analysis of flow diagram was used by 13 percent, and the same percentage used time studies. Only 11 percent relied on comparison of actual with rated capacity of each piece of equipment. And here is a point of extreme interest—only 11 percent based their expenditures on a calculation of percent return on investment. Yet, some very successful companies depend upon the latter method to plan and program improved efficiency through capital expenditure.

A most revealing plan was made public at the National Crushed Stone Association annual meeting in Miami Beach, Fla., last January. It was given in a paper by W. Julian Parton, vice president of operation, The General Crushed Stone Co. He described the method used by his company in determining the economies of increased output.

As Mr. Parton said: "Large investments in equipment and plant facilities are required to produce crushed stone." Actually, it took $1,637,000 for a newly opened operation of The General Crushed Stone Co. Noting that the plant's rated capacity was 250 tph., but that actual output the first year averaged 262 tph., Mr. Parton figured that his company spent $6,250 to install facilities to produce 1 tph. Assuming that the economics justified this expense, General Crushed Stone prepared a chart to show how much more money could be spent at the plant to increase output beyond its rated capacity.



The chart gave authority to the speaker's statement, "An increase of only 1 tph. of output will result in an additional 2,160 tpy. of crushed stone, yielding a sales realization of approximately $3,500." He listed two advantages to a producer when an expanded market influences him to increase his plant's output: Not only does he satisfy the bigger market for his product—he also makes a fine return on "extra bonus" tonnage. Most of the cost for this additional output, said Mr. Parton, comes from wear and tear on the equipment. Usually no increase is required in the labor force, so the additional tonnage is obtained at no labor cost.

Stepping up plant capacity has an advantage even if the market for crushed stone cannot be increased, Mr. Parton added. In those cases, upping the capacity enables a company to cut back hours of operation while producing the same output. Naturally, this results in reduction in overtime payments to employes and cuts labor costs.

Bottlenecks were scored by the speaker as chief obstacles to the production-and-profits goal. "The operator of a crushed stone plant cannot afford to have one part of his plant hold up or regulate the tonnage quarried, crushed and screened through the rest of the plant," he declared. Every part of the plant has to balance with the others, and all must work at reasonable capacity levels if fullest benefit is to be realized.

The General Crushed Stone Co. had just such a bottleneck which Mr. Parton gave as an extreme example. In its new plant mentioned above, the primary final sizing screen following the stone scrubbers caused excessive vibration to the structure when large volumes of stone passed over it. Advised by the operating department that the plant could handle 25 tph. more if the screen were replaced by a larger, different-type unit, the company installed the new screen. Installation cost was $15,000, permitting a 10-percent increase in capacity for less than a one-percent increase in cost of the plant.

It was a small price to pay. "The cost of each additional ton per hour output for this change," said Mr. Parton, "was $600, as compared with $6,250 for the original installation." On the chart, you will note that the increased revenue curve shows the expenditure resulting in some $85,000 additional gross revenue, most of which is profit. The operating department's suggestions were practical and profitable—bringing capacity of the new plant up to 288-tph. average from the 262 tph. it produced initially.

Mr. Parton concluded that older stone crushing plants could benefit by cutting out profit-blocking bottlenecks. Operators should scrutinize their

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AGGREGATE PRODUCERS INVEST FOR PROFIT, *continued from p. 77*

plants for any such bottlenecks and eliminate them. "Balancing out" the various parts of the plant will improve any firm's profit picture.

Another case history on the same subject has been reported. In this instance, an aggregates producer followed the practice of replacing capital equipment only when the current operating machinery was no longer serviceable, or when a different type was needed. That system often resulted in emergency purchases which later proved incapable of handling the job. Eventually, the company programmed a systematic procedure to determine the feasibility of replacing or changing a machine or method.

Here's how the scheme works. Someone suggests a change. A committee made up of the production manager, maintenance supervisor and the chief engineer reviews the need and specifies the type of equipment best suited for the job. The purchasing department gets quotations on the equipment and consults the supplier. A detailed analysis is then made, using the quotations as a base. The analysis shows whether or not there will be a satisfactory return. If not, a substitute solution is recommended by the committee. On the other hand, if it is satisfactory, a request to purchase the equipment is submitted to the expenditures committee for approval.

The company uses the Machinery and Allied Products Institute system for analyzing all capital expenditures. The formula makes a comparison between next year's estimated operating cost of the present equipment and the estimated operating cost of the proposed equipment. To this is added the difference between the costs of keeping the existing equipment and of acquiring the new.

On present equipment, items such as repairs, salvage value, salvage value loss, and interest on money for these items are considered. Actual depreciation, cost of money and the anticipated salvage value are considered for the proposed equipment. To top off the system, follow-up analyses are made to compare the actual operating and capital costs with estimates used in the original analysis. The method has proved most successful.

This workable system was described by Henry J. Schwellenback, production manager for New York Trap Rock Corp., in an address before the 1959 meeting of the American Institute of Mining, Metallurgical and Petroleum Engineers.

A simple formula to determine percent of return on capital investment is used by another company. An example is:

Cost of improvement	$10,000
Gross savings in one year	4,000
Life of improvement—10 years	
Gross savings in 10 years	40,000
Initial cost	10.000
Net savings in 10 years	$30,000
Net annual savings	$ 3,000
Annual return—30 percent	
Years to recover investment—3.33	

Some method of determining the gross savings in one year must be used; it could be similar to the plan of MAPI, as described above. When that figure is learned, and years of life of the equipment are set, the above calculation can be made very simply.

The ROCK PRODUCTS survey was productive of data from some producers, both large and small, to indicate that such method was being used. Average percent of annual return on capital investment in the sand and gravel industry was reported as 19.8 percent. Years to recover the original investment in the equipment for that industry was an average of 5.6. The comparable figures for the crushed stone industry, according to the survey, were 23.3 percent and 4.3 years. For both industries combined, they were 22 percent and 4.55 years. This information is indicative of the increased attention being paid to costs and projected efficiency increases by the aggregates industry.

Additional information reported in the survey showed that 58 percent of those replying reduced production cost in 1958. The figure held steady for all sizes of companies. The average reduction of cost was 10.5 percent. As to method used in reducing cost, 51.5 percent reported they increased output with the same labor cost. About 40 percent stated the reduction came about by lowering labor cost and increasing output.

Furthermore, nearly 40 percent reported a reduction in production cost by increasing output from installed equipment. This indicates a smart job of matching actual equipment output with rated capacity. New, more efficient machines were installed by 20 percent, whereas 17 percent installed complete, more efficient plants.

Average amount of capital improvements made per reporting company in 1958, according to survey results, came to $252,000; that amounted to 17 cents per ton of 1958 output and 11.5 cents per ton of annual capacity. The smaller plants apparently spent more money on capital improvements,

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HOW PRODUCERS ARE SAVING MONEY

by Kneeland A. Godfrey, Jr.

Here's specific proof that careful attention to cost figures can pay off handsomely. The next 14 pages show how new, high-efficiency machinery and methods, flexibility to find new markets and adaptability to new managerial techniques can raise sales and profits.

Every major phase of production is represented—opening a new deposit, excavation, haulage, materials handling, crushing, beneficiation, and plant design and management. Whatever your problem, there's sure to be plenty of helpful information here for you.

The case histories selected are tops among dozens sent to us by cost-conscious producers and manufacturers. These contributors join with us in helping you keep the vital rock industries growing and profitable.

1. Loosening the deposit

Ripping gains in stature

ROCK CAN OFTEN BE RIPPED for considerably less than the cost of drilling and blasting, where this method is suitable for use on a production basis.

This statement is well documented in a report prepared by the Caterpillar Tractor Co., in which per-ton costs for drilling and blasting plus costs for tractor-mounted rippers are given. An important qualification on the potential use for ripping: many rock deposits are too hard for a ripper.

Location	Material	Ripping (¢/cu. yd.)	Drilling-Blasting (¢/cu. yd.)
Tulsa, Okla.	Limestone	7.3	17.3
Dallas, Tex.	Limestone	5.2	15.1
Chicago, Ill.	Limestone	6.5	—
Philadelphia	Limestone	11.5	19.3
San Francisco	Sandstone	15.0	30.0
Carbo, Va.	Sandstone	8.6	15.7
Hibbing, Minn.	Frost	25.0	60.0
Hibbing, Minn.	Paint Rock	6.1	54.5

What materials are rippable? Caterpillar made over 200 tests in 18 states to find the answer. Depending on the size of the ripper and the hardness of the rock, all clay, most shale, sandstone and caliche and the softer limestone may be ripped efficiently.

How do you determine whether a deposit is suitable for ripping? Caterpillar's findings have resulted in an inexpensive, quick and "reasonably accurate" method of determining rippability in a dozen common materials.

This technique, seismic analysis, requires only simple equipment and two men with a few hours' training. The 20 to 30-min. test determines both the rippability of subsurface deposits and the depth of each layer beneath the testing area.

Seismic analysis is basically sound wave measurement. A steel plate is set on the ground and struck by a hammer, transmitting sound waves through the ground to geophone receivers. Transmission time depends on the density of the earth and rock and the distance travelled. The producer

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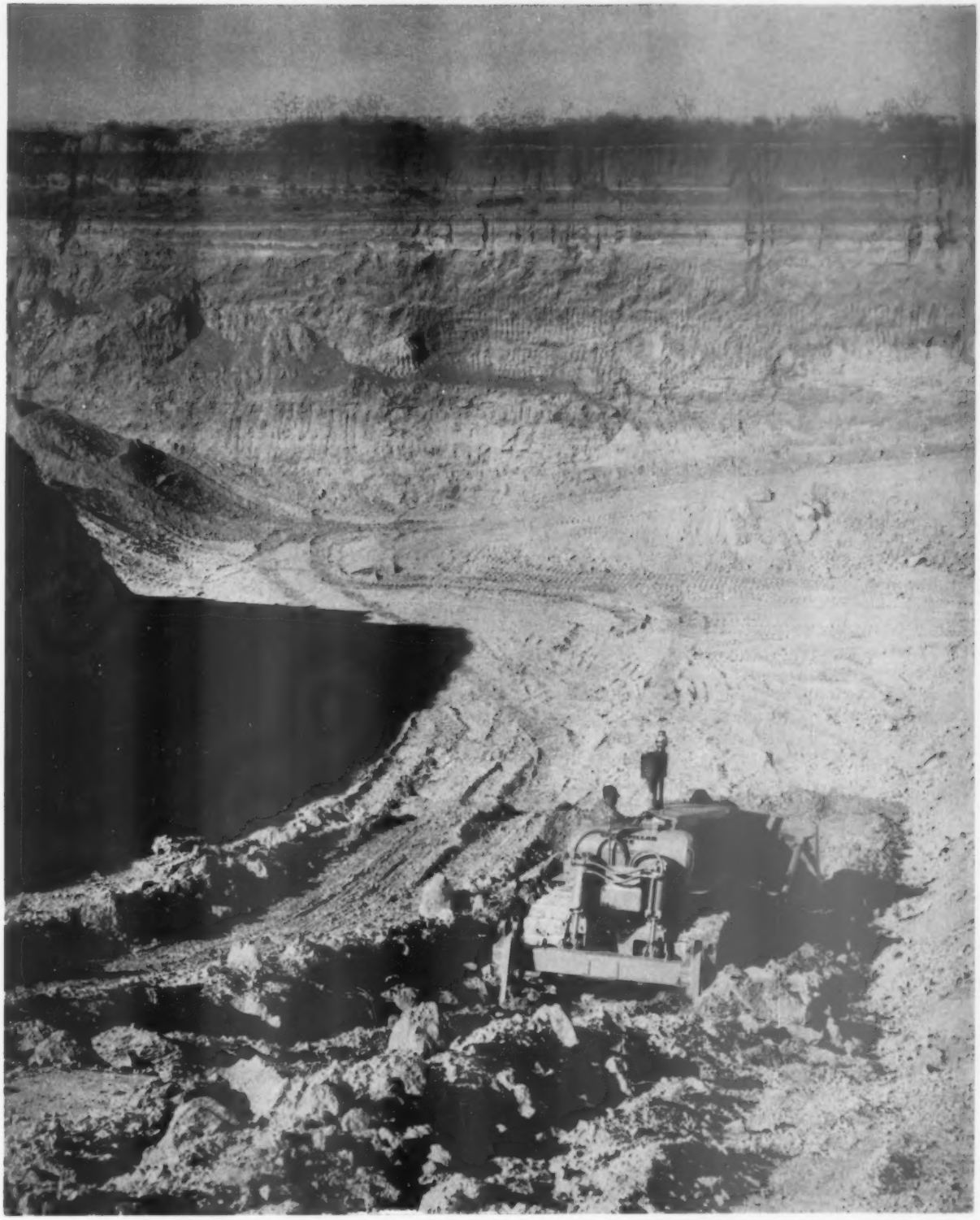
BIG DOWNHOLE DRILL with 7-in. bit tripled per-hour production to 464 tph. in New Jersey



THIS SINGLE CRAWLER rips, dozes and stockpiles 3,000 tpd.
at a caliche pit in Texas

RIPPING GAINS IN STATURE. *continued from p. 81*

can determine the density of his rock and the depth of deposit by plotting time and distance points on a graph.

Drilling and blasting is still by far the most popular way of loosening rock. Low-cost explosives plus more productive drills are cutting per-ton costs. Here are examples of economy methods now in use:

Both **prilled and premixed ammonium nitrate** explosives are cutting costs dramatically. Savings range to nearly 50 percent where prilled ammonium nitrate is used instead of former blasting methods, according to the National Lime Association. Major savings come in lower cost per pound of ammonium nitrate, which has nearly the rock-breaking ability (per pound) of dynamite.

One manufacturer, Spencer Chemical Co., reports a case history as follows: The comparison involves a typical blast at a midwestern plant with 21 holes of 6½-in. diam. Total cost for dynamite, primacord and connectors: $890.16. Total cost to do the same job with Spencer's N-IV ammonium nitrate, cord, fuel oil and connectors: $218.28, or roughly one-fourth the cost of straight dynamite.

Some reports indicate even lower cost figures for premixed ammonium nitrate products, such as DuPont's Nitramite FR and Hercules' Dynatex. Premixes overcome three weaknesses of prilled ammonium nitrate, one writer indicates: low density, poor water resistance, and the inconvenience of having to mix fuel oil with the prills on the job. Premixes require no mixing, can be made waterproof. Their greater density results in a higher denotation velocity than prills.

Waterproof characteristics and elimination of job-site mixing are advantages hard to evaluate in dollars and cents. But higher densities definitely give measureable results. For instance, a comparative test at an open pit iron mine showed a 14 percent saving in drilling and blasting cost over prills, plus better fragmentation. However, at least partially offsetting this gain was the 22 percent higher cost of the premix.

Improved drills and drill steels are cutting per-ton costs at many quarries. For instance, a rock producer near Ft. Lauderdale, Fla., had rather high drilling and blasting costs. Principal problem was that several strata of caving materials in his deposit caused filling of the hole when the drill steel was pulled out. This meant driving a loading tube into the hole, blowing caved material and cuttings out of the hole, and then loading. Because of this difficulty, only ten 20-ft. holes were drilled per shift and drilling costs were high.

A bit and **drill steel with a 2-in. hollow center**, which produces no core, solved the problem. After the 6-in. hole is drilled with the carbide insert bit, the pneumatic connections are removed and the hole is loaded through the hollow stem with 1½ x 16-in. 40-percent gelatin dynamite. An electric cap is placed at the midpoint of the load. After lifting stem and bit from the hole, it is ready for blasting.

Result of this time-saving method and higher capacity drill: An average of 80 holes per day are drilled now, compared with the previous 10. The efficient drill rig is made by Reich Drill, a division of Chicago Pneumatic Tool Co.

Downhole drills proved their production-boosting ability at Kingston Trap Rock quarry, Kingston, N.J. Here are the statistics on three successive drill rigs that the firm used: 1) churn drills, 6-in. holes, 2 ft. per hour, 16 x 18 ft. hole spacing; net of 53 tons per hour. 2) Quarrymaster purchased in 1950 with piston drill, 6-in. Carset bits, 3—6 ft. per hour, hole spacing 16 x 18 ft.; net tonnage per hour: 152. 3) Quarrymaster bought in 1955 with 7-in. Carset bits operated by Downhole drill, speed 12 ft. per hour, hole spacing 20 x 22 ft.; productivity of 464 net tons per hour. This latest addition more than doubled the feet-per-hour average of the 1950 piston drill, and tripled its per-hour productivity. The Quarrymasters are made by Ingersoll-Rand Co.

With high labor costs comprising a large part of total cost, larger and more costly equipment often pays for itself due to reduced labor used.

Secondary blasting expense was cut by one producer. His large rock quarry employs two labor-saving techniques. First, a big 60-in. gyratory crusher is used. Because it has such a large opening, only the largest boulders need to be broken down in the quarry. Second, a truck-mounted hydraulic crane, the Pitman "Giraffe," mounting a chain-fed wagon drill, drills holes for secondary blasting. Today only one man runs the entire operation, instead of the five men with jackhammers required previously. He uses Ensign-Bickford Quarrycord to ignite his safety fuses one at a time on several loaded boulders. He avoids the safety problem of five men all using caps and fuse, and the dangers of clambering over broken rocks with drill and air hose.

2. Excavating

Scrapers show per-ton savings

CAN SCRAPERS OUT-PERFORM excavator-truck combinations in aggregate plants? In some cases motor scrapers definitely cut per-ton costs, according to case histories cited by Caterpillar Tractor Co.

Example: Excavating sandstone for a highway job in Kansas, the contractor worked two adjacent cuts. This allowed direct comparison of costs of excavating rock by the two methods. Loading and hauling costs using three 18-cu. yd. Cat scrapers came to 7.3 cents per cu. yd., as opposed to 19.0 cents for loading with a 3-cu. yd. shovel and hauling with two 20.5-cu. yd. rear dumps.

The hourly operating cost used to figure the per-yard costs, based on industry averages, apply equally to all units:

SPREAD NO. 1 (SHOVEL AND TRUCKS)

UNITS	HOURLY OP. COST
1-3 cu. yd. shovel	$23.28
2-DW21-PR21 haulers at $16.98 ea.	33.96
Total hourly cost	$57.24
Av. hourly production	300 cu. yd.
Loading and hauling cost/cu. yd.	19 cents

SPREAD NO. 2 (SCRAPERS)

UNITS	HOURLY OP. COST
3-DW20-No. 456 Scrapers at $15.16 ea.	$45.48
1-D9 pusher tractor	13.22
Total hourly cost	$58.70
Av. hourly production	800 cu. yd.
Loading-hauling cost/cu. yd.	7.3 cents

The cableway excavator for sand and gravel operations can dig material from the pit and haul it to the plant surge pile for as little as 6 cents per ton operating cost. Operating costs for other techniques vary, but 10 to 25 cents-per-ton figures are common. Draglines and trucks, suction pumps and field conveyors all have their place, but the cableway's different design gives it these advantages:

(1) Operation by only one man controlling power, loading and dumping of the bucket (ranging in size up to 5 cu. yd. and more); (2) Ability to dig as deep as 100 ft. below water; (3) Ability to haul from 100 ft. to 500 ft. and more.

As with any piece of equipment, there are limitations to the use of a slackline. Singly, it does not have the capacity of a shovel-truck operation or a large dredge. Production is usually 200 tph. or less. However, several slacklines may be used to work adjacent areas in the pit.

Second, hauls cannot be made over distances of greater than 800 ft. Only a limited width of deposit may be worked without moving the tail assembly. Slackline excavators are made by Sauerman Bros., Inc., Bellwood, Ill. *Please turn page*

COSTS PER TON have been halved with use of scrapers to replace trucks and shovels

3. Haulage

Lighter trucks boost payloads

BUILDING AND MAINTENANCE of good haulage roads pays off in time and money saved. Highway Builder magazine points out that if haul speed is 13 mph. and five 20-cu. yd. haulers work over a distance of 1,000 ft., an additional 75 cu. yd. per hour can be moved by boosting haul speed just 3 mph. Smoother, harder haul roads with no chuck holes and shallow grades will do the trick. The producer can figure out for himself, using his operating conditions, just what savings he can expect to realize.

Here are some of the techniques used: 1) Cut rolling resistance by compaction and by spreading calcium chloride to hold moisture. 2) Fill and compact chuck holes; simply blading them full with loose dirt won't do the job. 3) Use culverts to eliminate wet spots in low areas. 4) Consider paving your haul road; advantages include sharply reduced maintenance, greater fuel economy, better tire life. A metals mine paved its haul system by compacting the road base, then adding pulp-mill waste and an asphalt seal coat; practically no maintenance work has been necessary during a year of hard service.

HUGE 37½-TON ALUMINUM BODY is a sample of the heavy-duty bodies being made today of lightweight aluminum

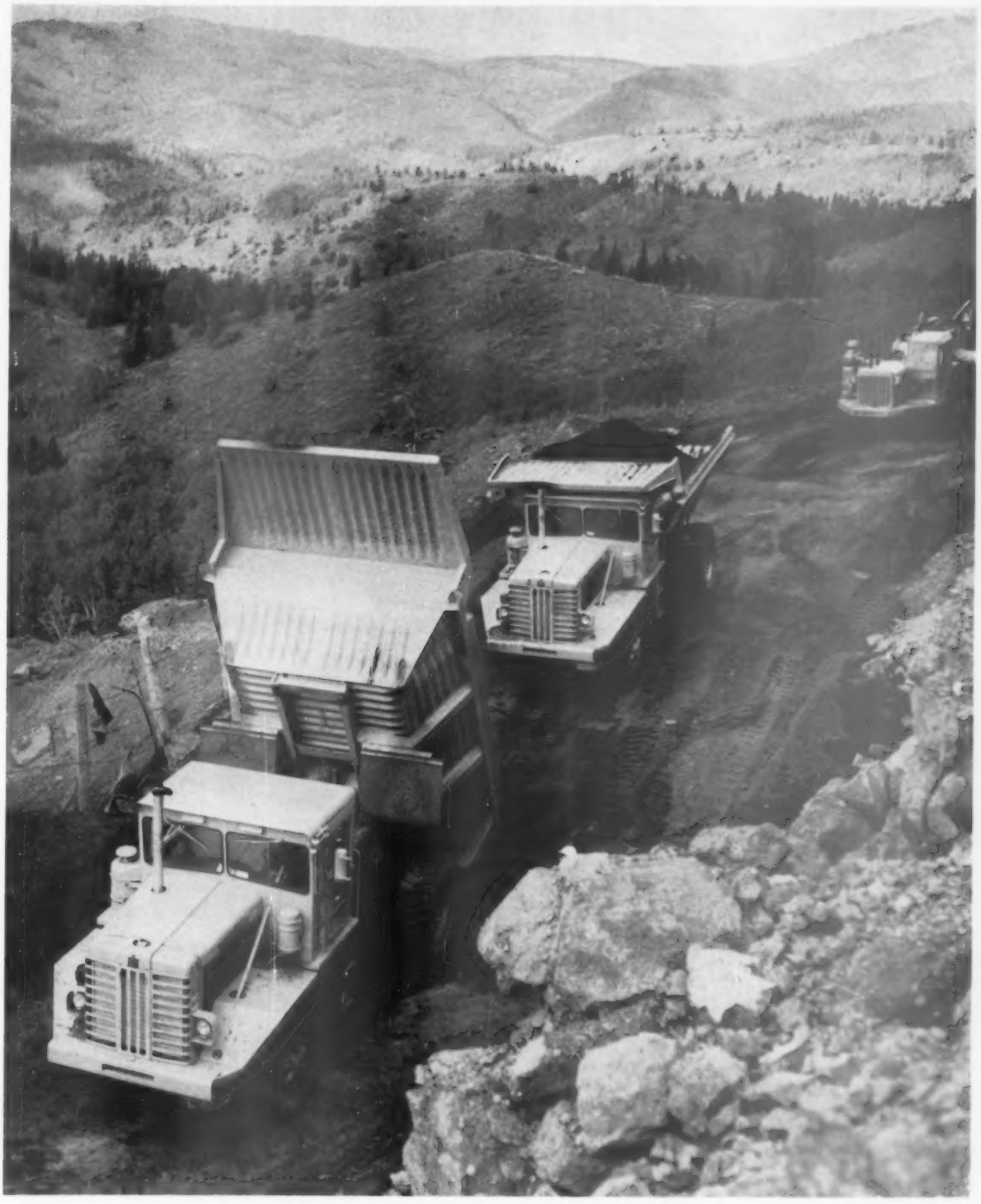
Stronger, lighter truck bodies are cutting per-ton costs. Here are three interesting ways manufacturers are doing the same job:

1) Moore Body Co., custom maker of truck bodies, is chopping 25 percent off the weight of its units by using Jones & Laughlin Steel Corp.'s **high strength Jalten steel.** Using Jalten in almost every part of its trailer dump bodies, Moore finds it can use a lighter gage steel and still get improved strength, resistance to corrosion, abrasion and impact damage. Though the steel costs about 20 percent more per pound, the bodies cost little more because lighter stock can be used safely. This reduced weight means significant gains in load capacity, more than offsetting any added cost.

2) International Harvester Co. has come up with an ingenious method of cutting truck deadweight. Its big 19 and 27-ton off-highway rear dumps are made of lighter steel, **corrugated** to boost carry capacity and cut weight. As a result, body deadweight is cut 30 percent. The units have 1 and 3 extra tons of carry capacity, because the reduced deadweight permits corresponding payload increases without beefing up the frame or increasing power.

3) Several truck and body makers are switching to **aluminum bodies** to cut weight. As much as 50 percent of dump-body deadweight is eliminated, permitting higher payload capacities which offset added cost. The weightsaving can mean up to 25 percent more payload per trip.

For example, Eastern Lime Corp.'s new 18-cu. yd. Perfection aluminum dump trailers can carry about 3,000 lb. more payload than comparable steel bodies, because of aluminum body and tractor parts. Added payload alone is worth $25.87 per



BRAND NEW 19-TON TRUCK has an added ton of haul capacity because of lighter corrugated steel body

day, according to Perfection figures. Basis for calculations: Each of the five trucks makes three 90-mi. trips daily. With an extra one and one-half tons for each of the 15 truck-trips daily, at $1.15 per ton, a total of $25.87 extra is earned.

Aluminum bodies can cut costs in two other ways: Lower weight when "deadheading" back to the quarry means reduced operating costs; second, aluminum is corrosion resistant, never needs painting.

Please turn to page 88

IF YOU PACKAGE **CEMENT**

you can cut bag costs with **WONDERWALL**™

For example, 9 cement companies show average savings of $2.75 per M bags by switching to the new, tougher WONDERWALL from their natural kraft bags.

Typical of these savings are those of one prominent cement firm that had used a 15½" x 3" x 27½" four-ply bag of 160# total paper basis weight. When they changed to a three-ply WONDERWALL of 130# total paper basis weight, they saved 30# in paper basis weight and cut their cost by $2.85 per M bags.

The comparable bag constructions were:

Old Natural Kraft Multiwall	
4/40	160# Total Paper Basis Weight
New WONDERWALL	
2/40, 1/50	130# Total Paper Basis Weight
	Saving 30# Paper Basis Weight

Even though lighter, WONDERWALL resists breakage better because it's made with Kraftsman Clupak*, the extra-strong kraft with the built-in *stretch*.

See how WONDERWALL can cut *your* bag costs! Just write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y.

*Clupak, Inc.'s trademark for extensible paper, manufactured under its authority.

West Virginia Pulp and Paper

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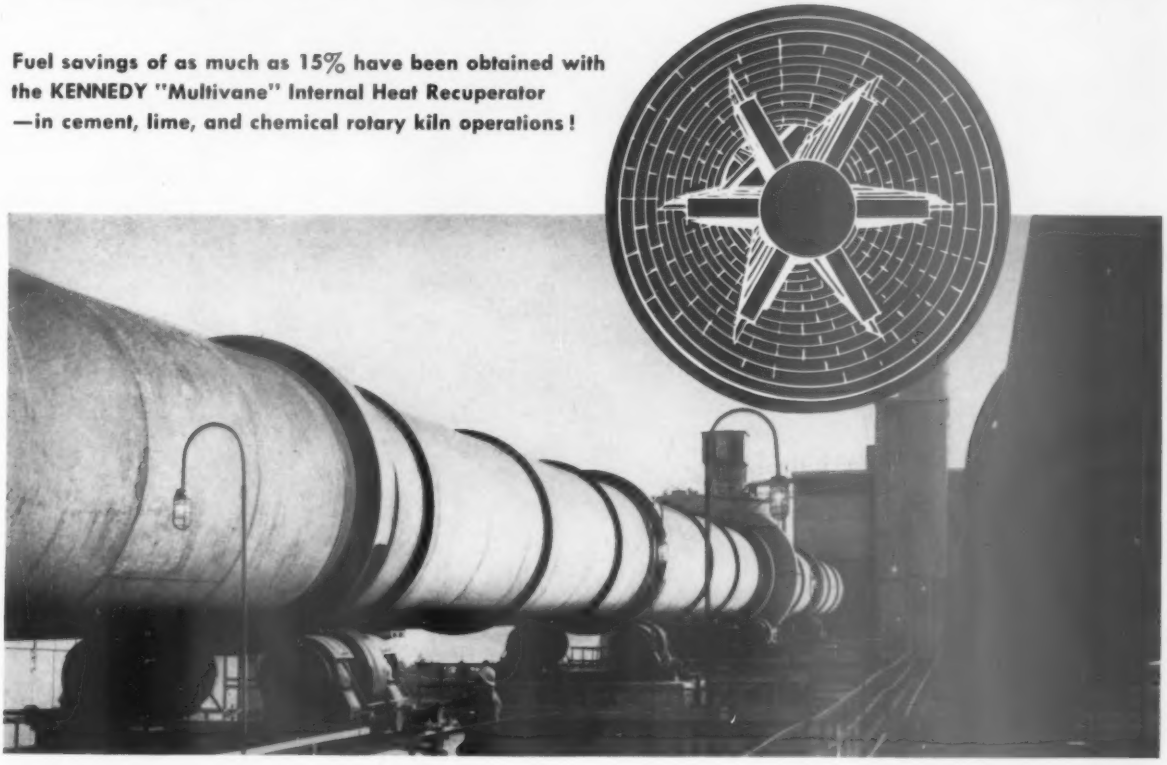
ADD ECONOMY to Your Kiln Operation with a KENNEDY MULTIVANE INTERNAL HEAT RECUPERATOR

Fuel savings of as much as 15% have been obtained with the KENNEDY "Multivane" Internal Heat Recuperator —in cement, lime, and chemical rotary kiln operations!



ITS PRINCIPLE IS SIMPLE . . .

In ordinary rotary kiln operation, a limited percentage of the kiln charge is in direct contact with the hot refractory and with the hot gases. By installing internal, heat-resistant, cast alloy steel plates, each having six integral, diagonal vanes, both the direct heat transfer surface and the exposure of the kiln charge to the hot gases are increased by almost 200%!

ITS ADVANTAGES ARE MANY . . .

With the "Multivane" Recuperator far more heat is absorbed by the kiln charge, radiation loss is reduced and less valuable heat is lost up the stack. Gas flow is maintained at its optimum velocity and dust loss is sharply reduced.

OTHER ADVANTAGES OF THE KENNEDY "MULTIVANE" INTERNAL HEAT RECUPERATOR ARE:

- Recuperator parts are of minimum thickness, maintaining high kiln cross-sectional area;
- Alloy shoes, the exact size of refractory brick and spaced to fit the refractory courses, provide simple, yet effective, attachment to the kiln shell;
- Alloy hubs hold the recuperator in rigid alignment, but are independent of the kiln itself;
- Length and location of the recuperator in the kiln is determined by careful study and exactly fitted to the specific operation;
- KENNEDY "Multivane" Internal Heat Recuperators can be installed in existing kilns with a minimum of downtime.

ADD ECONOMY to your Kiln Operation. Investigate, with no obligation, the proven performance of the KENNEDY "Multivane" Internal Heat Recuperator.

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TOUGH 60-IN. BELT freed three men from picking cobbles, boosted production from 175 to 300 tph.

THIS BIG 8 X 10-IN. PUMP replaces stacker belt, front-end loader and dozer formerly used to stockpile sand

4. Materials Handling

Larger units cut labor costs

A RUBBER-LINED PUMP is saving money for Bryan Rock and Sand Co., Garysburg, N.C. Bryan had been using a stacker belt, loader and bulldozer to stockpile sand in several areas at the plant. Today the 8 x 10-in. pump replaces all three. This cuts labor requirements, while freeing the dozer and front-end loader for other duty. Sand is pushed in a slurry to any selected storage area. Although in continuous operation, the pump requires virtually no attention.

How is the pump performing? During a year of moving 2,000 tpd. of sand, only one minor pump part needed replacing. The pump is driven by a 125-hp. electric motor and Texrope V-belt drive. Allis-Chalmers Mfg. Co. produced all components.

A 60-in. belt conveyor freed three men from picking cobbles and boosted production from 175 to 300 tph. at a Great Plains aggregates plant. The tough U.S. Rubber belt can take bulldozed loads and cobbles directly. Oversize too big for the crusher is now eliminated by a grizzly at the discharge end of the 35-ft. conveyor.

Production was boosted to such an extent that a second dozer is needed to work belt and plant to capacity.

The costly abrasive wear of steel hoppers and a sand pump box is no longer a problem at West Des Moines Sand and Gravel Co., Iowa. Until recently, the firm spent $200 annually to repair and replace these items. Now Herb Kelly, plant superintendent, uses Gates **rubber-faced steel plate** in areas subject to the most serious abrasion. He finds this four to six times more effective than steel plate alone.

The wheel tractor shovel (front-end loader) often cuts time and labor costs. Several reasons for its popularity in the aggregate industry for rehandling finished material into delivery trucks are illustrated by these case histories.

(1) Most tractor shovels in use today are considerably faster than crawler-loaders, because they are mounted on wheels. (A ROCK PRODUCTS survey showed that roughly two-thirds of the 10,400 units in the industry are wheel mounted.)

This speed comes in handy when the unit must load at several scattered points. For instance, Atlantic Gravel Co., Toms River, N.J., uses its 2-cu. yd. Trojan unit to load gravel at three distinct spots: First at the pit, where the Trojan loads 20-ton capacity semi-trailer rear dumps. Second, at the sand stockpile, ¼-mi. away, where seven-ton rear dumps are loaded out. Third, 500 yd. away, at Atlantic's Toms River Concrete Co. subsidiary, where the 2-cu. yd. unit must load the crusher hopper with 500 cu. yd. of rock per day. To load out 80 trucks each day, plus the crusher hopper, requires good speed. Only the wheel unit could do the job.

(2) Larger units are cutting labor costs and loading time. The single HO Payloader used at Limestone Dayton Co., Dayton, Ohio, completely replaces a previous 2-machine operation. Loading out as much as 600 tph., the 9,000-lb. capacity Hough unit has halved labor costs in this part of the plant. A second example: a 4-cu. yd. Michigan unit, working at Meshberger Stone Co., Columbus, Ind., loads a 15-ton haul truck in one minute.

(3) Wheel tractor shovel sharply lowers maintenance costs and downtime. George Smith, president of Smith Sand Co., Garden City, Kans., reports that maintenance costs on his Tractoloader are roughly 10 percent of what they were for crawler loaders. "A constant maintenance problem centering around malfunctioning treads" was the major weakness of the crawler units. Mr. Smith points out that this higher downtime was particularly crucial since customers' trucks sometimes had to sit idle while loader repairs were made.

(4) Improved transmissions are cutting cycle time during loading for some tractor shovels. The 1-cu. yd. Work Bull used by C&S Gravel Co. at its Hamilton, Tex., operation recently loaded 7-cu. yd. trucks in 2½ min. each for a one-hour stretch. This fast loading, for the bucket size, is possible in large part because of the Massey-Ferguson unit's instant forward-reverse transmission.

Please turn to page 92

For extra high *strength wire rope...*

use CF&I-Wickwire *Double Gray*

The CF&I Image reflects CF&I's experience as a producer of many steel products and CF&I's versatility in developing new products to meet exacting requirements . . . like Wickwire Double Gray*.

The special steel used in Double Gray provides extra resistance to the deforming effects of peening and crushing which occur on the drums and sheaves of heavy equipment. Double Gray also gives extra resistance to abrasion.

Because of these superior qualities, Double Gray rope quickly repays its slightly higher initial cost in safer, more economical operations. Use it wherever extra high strength wire rope is required.

For a free copy of our Double Gray booklet, write to: Advertising Department, The Colorado Fuel and Iron Corporation, 575 Madison Avenue, New York 22, N. Y.

**Wickwire Double Gray Wire Rope is made of extra-improved plow steel. Fortified by an independent wire rope core of the same extra high strength steel, Double Gray rope has a 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.*

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In the West: **THE COLORADO FUEL AND IRON CORPORATION**— Albuquerque · Amarillo · Billings · Boise · Butte Denver · El Paso · Farmington (N.M.) · Fort Worth · Houston · Kansas City · Lincoln · Los Angeles · Oakland · Odessa (Tex.) Oklahoma City · Phoenix · Portland · Pueblo · Salt Lake City · San Francisco · San Leandro · Seattle · Spokane · Tulsa · Wichita

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"Spotty, as a digger, you just ain't got it!"

Without realizing it, Billy has hit upon a basic truth in the excavating business. To come out on top, you've got to use the best equipment for the job.

With many factors beyond a contractor's control, choosing the right equipment becomes especially important. For this is one thing a man *can* control.

That's why so many contractors choose Bucyrus-Erie. They have learned . . . as their fathers did before them . . . that B-E machines are built for more than ordinary digging. They are built to handle the toughest jobs — and still perform better.

BUCYRUS ERIE

5. Crushing and grinding

New crushers increase yield

PRODUCTION INCREASES OF 40 PERCENT and more are reported by users of the new Cedarapids **Twin-Jaw Crusher.** High speed, to give more impact velocity, plus force-feed design and minimized jaw rubbing assure long, low-maintenance life. Iowa Mfg. Co. reports up to eight times the previous jaw life.

J. W. Jones Construction Co., Albuquerque, N.M., is proving the high level of production possible with the new Challenger plant and twin-jaw crusher. Production totals a remarkable 775 tph., according to Mr. Jones. About 500 tph. is ¾ x 2 in., with the rest minus ¾ in. (about 20 percent of this product is crushed).

A familiar problem with **impact-type crushers** —abrasive wear—has been successfully attacked by a new crusher design in use at Light Weight Aggregate Corp., Livonia, Mich.

The rotating cage and outer shell of the crusher are designed to catch some of the raw material, allowing a hard-packed cake of crushed material to form. Thus abrasive wear is sharply reduced, because impact is against the compacted coating and not against the steel itself. Replaceable tips on the bars of the D'Centegrator's rotating cage cut downtime to an absolute minimum, reports Light Weight Aggregate and the crusher's manufacturer, Simplicity Engineering Co. A bonus feature: the hard-packed cake catches any tramp iron in the feed, eliminates it from the product.

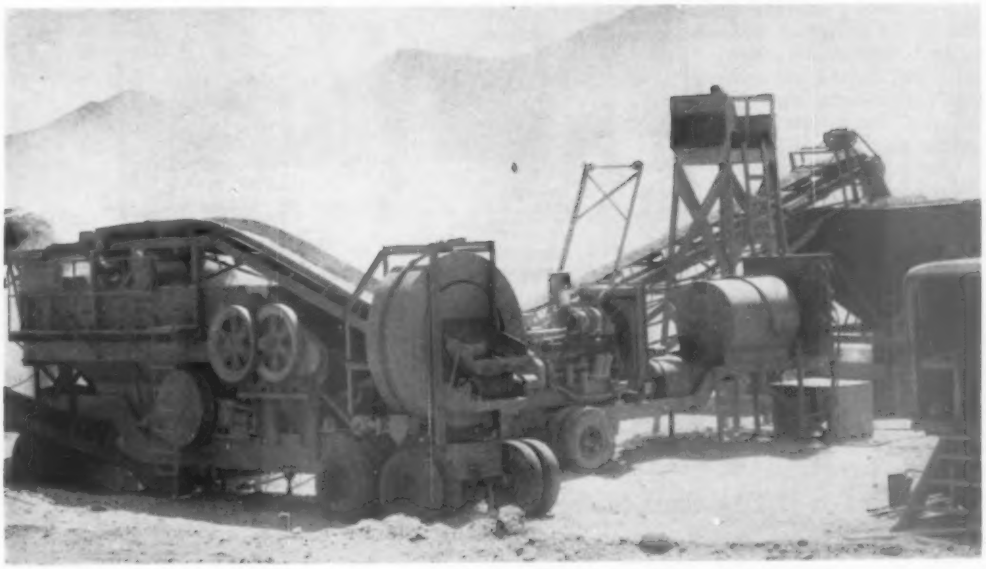
What about production and cost figures? Light Weight Aggregate reports that the crusher reduces its 1½ x ⅜-in. feed to minus ⅜-in. at a rate of 150 tph. Cost averages under 10 cents per ton. Estimated cost for less abrasive materials such as gravel: somewhat higher.

Winter Bros. Material Co., Fenton, Mo., uses a 54-in. Symons **Gyradisc crusher** to solve a serious problem caused by surplus torpedo gravel. The crusher converts roughly 300 tpd. of surplus ⅜-in. torpedo gravel into saleable manufactured sand. Two Symons V-screens dewater the gravel before crushing, reducing moisture content to a workable 2½ percent. Result: a serious storage and disposal problem has been eliminated and a profit made.

A dramatic boost in life—two years plus, as opposed to the previous six-month period—is the record achieved by **Ni-Hard crusher concaves** used by Spencer Quarries, Inc., Spencer, S.D. Formerly, the lower ring of manganese steel concaves on their gyratory crusher had a limited span of use. Manganese steel was not suitable for the 100,000 psi. compressive strength of Spencer's hard quartzite. Ni-Hard is made by International Nickel Co.

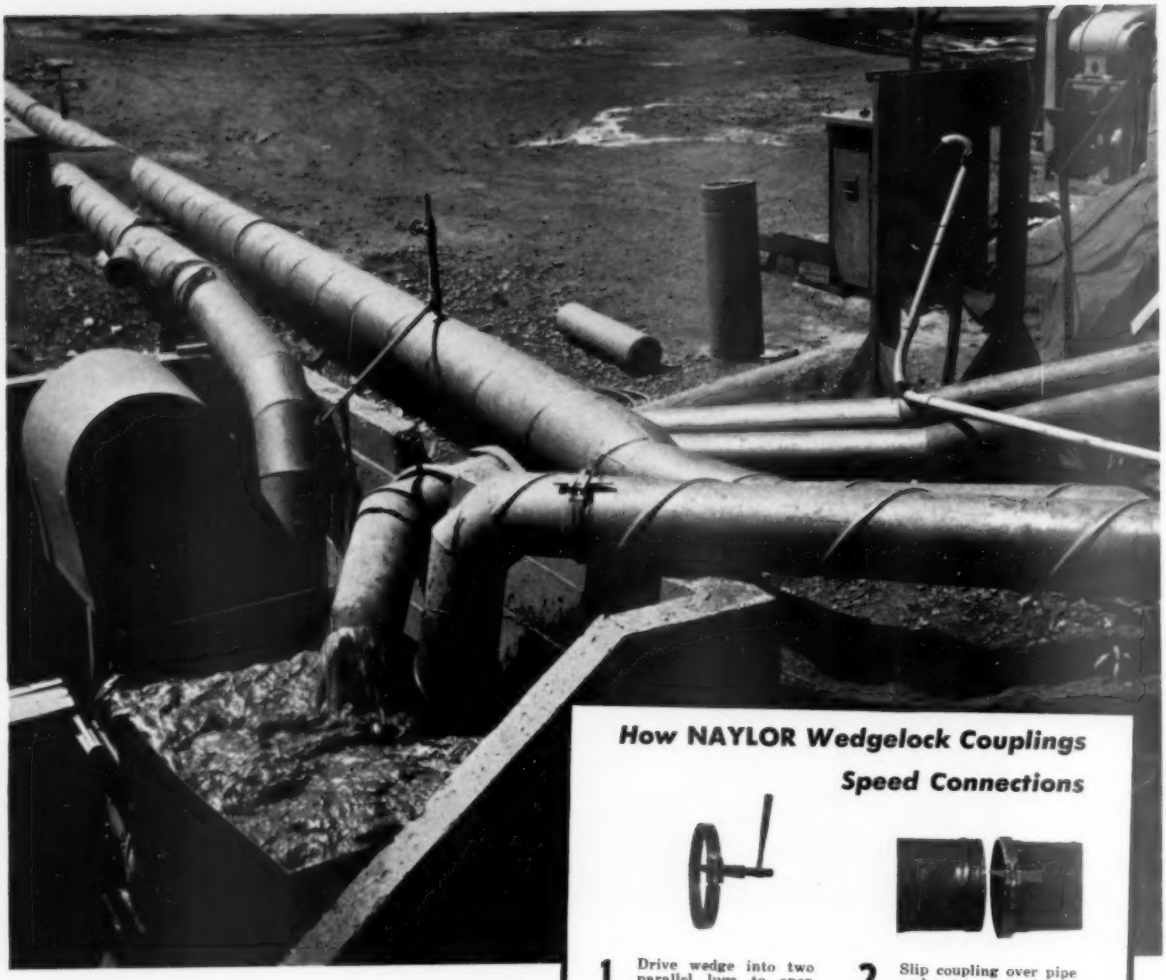
Please turn to page 96

BIG PORTABLE CRUSHING PLANT puts out 775 tph. of 20 percent crush



ABOVE: New-type crusher has cut maintenance costs sharply at a Michigan lightweight aggregates plant

AT HOME...*Where Things are Happening*



NAYLOR Spiralweld pipe and Wedgelock couplings are always ready for action in mining service. The two go together for lines that are light in weight but heavy on performance. They simplify handling and installation. They give you lines that are stronger and safer—while saving you time, work and money. Whether you need pipe for tailings, water or ventilation, it will pay you to consider the advantages of this NAYLOR combination. Write for Bulletin No. 59.

How NAYLOR Wedgelock Couplings Speed Connections

1 Drive wedge into two parallel lugs to open coupling.

2 Slip coupling over pipe and put next section in place.

3 Drive out opening wedge so coupling snaps into place on grooved ends of pipe.

4 Drive wedge home into the three lugs on coupling. A hammer is the only tool needed.

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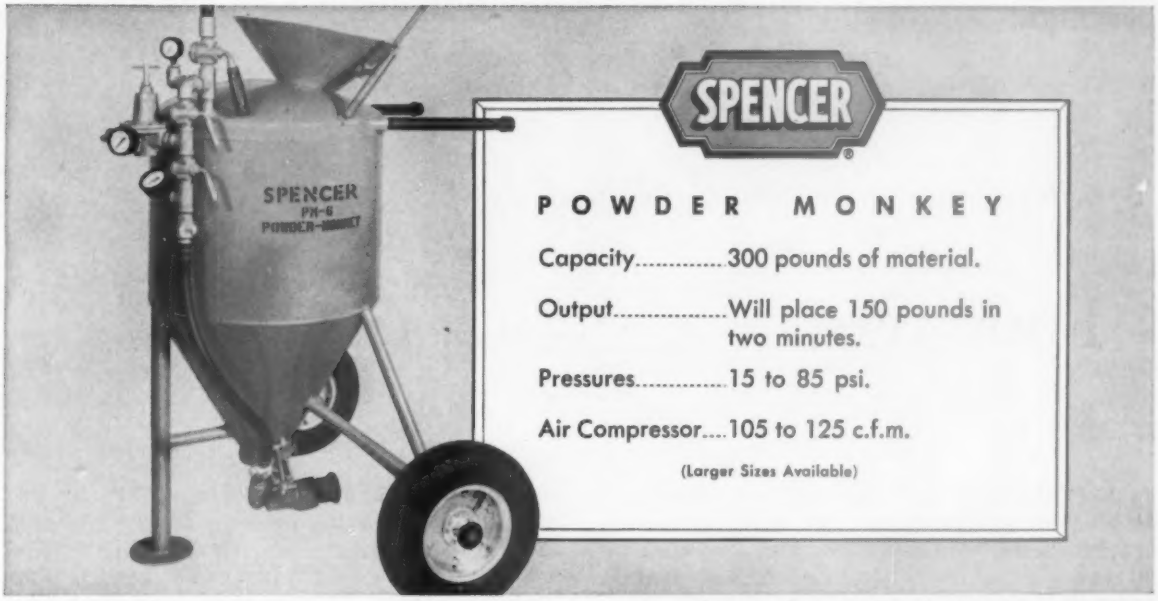

One man is all it takes to fill horizontal holes with Spencer N-IV Ammonium Nitrate and fuel oil, when you use the new Spencer Powder Monkey. Available with wheels for towing, or mount on powder truck.

Now! A Fast, Easy Way To Fill Horizontal Holes With Ammonium Nitrate-Fuel Oil Mixtures:

New Spencer Powder Monkey saves you $3.00 to $4.00 per 100 pounds on bag costs alone!

Scientifically designed for placement of Spencer N-IV Ammonium Nitrate-fuel oil mixtures in horizontal blast holes, the Spencer Powder Monkey extrudes the mixture into the hole. Then the Powder Monkey is filled with sand, which is blown into the holes for stemming.

There's no need for tamping bags, tamping equipment, or the labor needed to fill and tamp bags into the hole!

With the Spencer Powder Monkey, you can actually load faster and more economically than with any other known method! Job-tested on holes ranging from 1⅝ inches to 8 inches in diameter, the Powder Monkey has proved itself under a wide variety of conditions.

Another advantage of placing Spencer N-IV and fuel oil with the Powder Monkey is that you can prime the entire charge with detonating cord at the same time you insert the hose in the blast hole for filling.

World's Most Efficient Low-Cost Blasting Method

Spencer N-IV Ammonium Nitrate, combined with fuel oil and fired with detonating cord, produces a superior blast for these two reasons: (1) Spencer N-IV has a special structure that lets the prills absorb oil more easily. (2) Spencer N-IV contains a higher percentage of ammonium nitrate than other brands.

Because of these two advantages, Spencer N-IV as an ingredient in blasting agents produces more energy than competitive grades of ammonium nitrate, yet costs no more!

With Spencer N-IV and fuel oil you save on priming costs, too, because this mixture can be initiated with a single strand of 175-grain detonating cord. And you put an end to the danger of storing high explosives on the job site because Spencer N-IV by itself is not an explosive!

Spencer N-IV is available in all-plastic 50-lb. bags that are tougher than paper—so tough they reduce breakage as much as 50%. And you can store them right out in the open. (Also available in paper bags.)

For complete information, mail the coupon below:

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Yes! I want to know more about:

☐ Spencer Powder Monkey
☐ Spencer N-IV Ammonium Nitrate as a blasting ingredient.

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6. Beneficiating, washing, classifying

Four rigs raise gravel quality

BENEFICIATING OF GRAVEL not quite up to today's tougher aggregate specs is a widely practiced art. Producers find that by spending about five to 20 cents per ton in additional equipment and operating costs they can ask a higher price, for they get much improved products. It is often cheaper to beneficiate lower grade material at an existing plant than to move to a new site.

Jackson Pike Sand and Gravel Co., Columbus, Ohio, installed a Mobil-Mill **heavy-media plant,** with 8-ft. drum separator. Result: improved quality. Trouble meeting state and federal specs for exposed concrete has been eliminated. The Wemco unit removes nearly all (less than one percent remaining) the chert and shale, which averages eight percent in the pit run. Both sodium sulfate and abrasion loss are now well under state specified maximums.

Jigs are adding to efficiency for aggregate producers. The Massillon, Ohio, plant of Standard Slag Co. has a raw material with 8 to 15 percent shale, cherts, rotten sandstone, coal and limonite nodules. Four 5 x 7-ft. Meckum jigs cut the deleterious content impressively—to less than 2 percent. This is true for all but the pesky limonite nodules, which are dense enough to pass with the sound gravel. Here a Stedman rotating **cage disintegrator** comes in handy, breaking down nodules made brittle by their iron oxide coating. By passing all coarse aggregate through this unit first, unbroken limonite content is cut to less than one percent in the finished product. Combined output of the four jigs averages about 120 tph.

A McLanahan **log washer** and Stedman **cage disintegrator** combination at Grand Rapids Gravel Co., Grand Rapids, Mich., provides an excellent beneficiating system. While just hard enough to resist the pummeling given them in the log washer, the deleterious material and cherts are easily broken down in the cage mill. Mill speeds must be chosen carefully so as little as possible of sound, hard gravel is broken down. This equipment combination has also proved successful for Irving Materials Co., McCordisville, Ind., and Shenk Gravel Co., Durand, Mich.

The rising-current classifier, recently introduced to the sand and gravel industry, simplifies dredging and cuts labor costs for one producer. As installed at Ohio River Sand Co., Louisville, Ky., the 300-tph. Fuel Process Co. unit is efficiently removing coal and sticks from the firm's river-bottom deposits. Previously, up to three men were needed to pick coal and sticks from the finished product; today none are required.

Here are two examples of improved screening practice: The **V-screen,** a rotating cylindrical screen, is a valuable new unit for fines separation. Roughly twice as much output per unit of area is reported for the V-screen as compared with vibrating screens, in the five to 80-mesh range. Arcole Midwest Corp., Chicago area contractor and rock producer, is using two 4 x 12-ft. Nordberg V-screens in its crushed stone operation. A second advantage given for the rotating screens: Exceptional cloth life results, since stone strikes the cloth at right angles, and with only moderate impact.

A vibrating screen test conducted by Cleveland Wire Cloth and Mfg. Co. in Standard Slag Co.'s Lordstown, Ohio, plant showed high efficiency in processing of specification slag. Problems of screening included abrasion, continuous process steam and corrosive sulphur. The results of using **new screen sections and new alloys** were continuous use for nearly 12 months and successful handling of over 123,000 tons of hot crushed slag without breakdown, and potentially good for another 20,000 tons. Screening costs per section were very low, both because of the well-chosen screen sections and good preventive maintenance.

Recovering fines lost in used wash water is a popular practice. It not only cuts the cost of dredging tailings ponds but, more important, it is an ob-

HMS PLANT in Ohio cut chert and shale in feed from 8 to less than 1 percent

vious source of the added fines that engineers are specifying for concrete and asphalt mixes.

How do you go about recovering these fines? Rock producers have come up with several methods, including liquid cyclones, settling tanks and air separators. **Liquid cyclones** are an effective way to remove fines from waste water, New York gravel producers agreed at their 1958 meeting. Paul Robinson, of J. W. Robinson & Son, Auburn, N.Y., noted that he needed more fines because of revised specs for asphalt mixes. His fellow producers quickly suggested the liquid cyclone.

How much do they cost to operate? Only pennies a ton, Ward Sand & Gravel, Palmyra, N.J., reports. After installing ten 14-in. cyclones, the firm found it was recovering 6,000 tons per week of saleable sand. Not only does the product recovered meet state asphalt-sand specs, the new operation also eliminates the need to dredge the tailings area frequently.

The Sand-Sort, a sand classifying tank, is used by a San Diego producer to recover 13 tons of sand per day worth $26 in added sales. At this rate, reports manufacturer Wemco, the unit will pay for itself in its first year of operation. While the Sand-Sort is efficient in recovering minus 100-mesh fines from the water, it does not retain the unwanted slimes. Proof of this, Wemco reports, is the fact that the unit's effluent contains true slimes, which pack and are hard to handle.

Another sand settling tank, a Hydro-Classifier, paid for itself in a few months, reports producer New Enterprise Stone and Lime Co., Everett, Pa. It recovers saleable 8 x 100-mesh chip stone, which makes ideal road-surfacing material, from waste water. Used in conjunction with a **Clarifier,** the operation can return clear water to the stream. Minus 100-mesh solids recovered by the Clarifier are wasted into an old quarry. Both units are made by Hardinge Co.

A big 12-ft. Sturtevant **Air Separator** is recovering 60 tph. of plus 100-mesh fines for Gary Bros. Crushed Stone Co., Bowling Green, Ky., to meet tough state specs. Smaller fines in the product had previously made it unacceptable for such uses as bridges. Today the minus 100-mesh product is separated out, and used to make a better grade of aglime.

Please turn page

7. Plant design, management

Planned expansion pays off

CAREFUL PLANNING FOR EXPANSION can cut labor and production costs sharply, though not necessarily because of any one piece of equipment. For instance, Cave Stone Co., Flat Rock, Ind., doubled their plant's capacity to 250 tph. at low cost. Careful study revealed that the only equipment needed was two new 15-ton rear dump units, an 8-ft. steel reclaim tunnel, three belt conveyors, a screen and two load-out bins.

While the plant had plenty of primary crusher capacity, most other processing screens and crushers would have to be replaced with larger units to double per-hour output. Today, with primary production for quarry and jaw crusher doubled, added day-shift output is stored in a surge pile over the new reclaim tunnel. Surplus is drawn out, if necessary, during a second plant shift (the quarry need work only one shift, even during busy months).

PRODUCERS ARE FINDING that stabilized road-base materials offer profitable market

Centralized control of plants inevitably means savings, because just a few men can control the operations. Key to the success of a portable plant operated by Anderson Bros., Brainerd, Minn., is push-button control, by one man, of the speed of the belt feeding the first plant unit—a flat-deck vibrator. Sitting at a station atop the unit, the single operator controls the plant, adjusting material flow to match equipment capacity.

A second interesting design feature of the portable plant is the power source, a single 310-hp. Cat diesel engine. It drives both the jaw and roll crushers directly, and the conveyor and other electric motors through a 60-kw. generator. Result: The plant can be taken to any job, need not locate near a source of electric power.

Labor costs cut nearly in half (from 22 men to 12) and production doubled to 250 tph.—that's the record set by Sullivan Highway Products Co., Sullivan County, N.Y. One reason for this improved labor efficiency of the Hewitt-Robins designed plant is the **load-out system.** Truck load-out bins and stacker belts handle all sizes of finished product, require no men to operate them. When possible, gravel is loaded out of the bins directly, but tractor shovels do an efficient job otherwise.

Zoning planning and land reclamation are integral parts of efficient plant management. Proof that producers can save money by **reclaiming worked-out pits** is given in the experience of Grand Rapids Gravel Co., Mich. Vice president Don Battjes found that by giving the public a fair shake

Please turn to page 100

SIMPLICITY

GRIZZLY FEEDER

3' x 10' Model OA—10—A3

eliminates need of apron feeder and scalper . . .

Rock can't jam . . . hourly operating costs lowered

The unique design of the Simplicity Grizzly Feeder, which combines feeding and scalping in one operation, eliminates rock jams thus assuring positive uniform flow of material into the crusher.

One operator of a Simplicity Grizzly Feeder says: "... we have used the heaviest type of apron feeders for years and have found it necessary to shut down at least 2 or 3 times a year to hard surface the flights, inasmuch as our material is so abrasive ... we installed a Simplicity (Grizzly) Feeder ... with 1/4" pan and 3/16" liner ... and are glad to report that, AFTER 9 MONTHS OF CONTINUOUS OPERATION, THE FEEDER PAN SHOWS PRACTICALLY NO WEAR WHATSOEVER, and is operating around the clock doing an excellent job of feeding at all times ..."

3' x 12' Model OA—10—A3

The Grizzly Feeder costs less than 50% of the combined apron feeder and scalper ... weighs considerably less ... makes a more compact plant ... and reduces loading height by several feet. While these factors show up so prominently in portable plant production, they are just as effective in a permanent plant installation for the crushed stone, sand and gravel and mining industries.

214

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PLANNED EXPANSION PAYS OFF, *continued from p. 98*

with reclamation, he was able to buy choice land, where another firm in a similar situation could not. The goodwill built by his firm's reclamation efforts brought a bonus in free advertising which, in turn, boosted sales. Third, reclamation brings a return in higher sale prices for the worked-out lands.

Organized effort to save good gravel lands from **restrictive zoning** pays off, as Los Angeles-area producers found out. Desperate because homebuilding in their mushrooming area was making it difficult to get needed lands, they retained consulting engineer Frank Gillelen. He made an extensive survey which showed that unless something was done to ease zoning restrictions, gravel supplies would be exhausted in 15 to 20 years. Positive results of his well-documented report: The Los Angeles Planning Commission is now more lenient in granting zoning exceptions. And, because selected areas are zoned as rich in natural resources, homes and commercial buildings are being built in other areas, leaving the needed lands free for future gravel plants.

Developing new markets is an outstanding way to increase profits. Two fast-growing new markets: stabilized base material for highways; portable plants to serve rural highway markets, including the Interstate program. **Stabilized base materials** are growing quickly in acceptance by highway engineers, because they provide high-density bases and resist freeze-thaw pressure. Used as a surface-course material for some rural roads, the materials usually serve as base courses and asphalt aggregate mixes.

Why bother to produce this variety of product? Raymond F. Wingo, Jr., of Southern Materials Co., Richmond, Va., gives a list of persuasive reasons: (1) It provides a new, large-tonnage market (up to 15,000 tons per mile on Interstate highways). (2) It employs surplus materials, including overburden (if not too high in clay content). Besides aggregates, stabilized base materials often contain 10 to 15 percent soil, calcium chloride (to retain water, which permits compaction to greater densities), asphaltic materials, lime or portland cement. (3) Noting the popularity of these materials in the Midwest and East, Mr. Wingo says that it is logical "to take advantage of supplying commercial materials for this type of construction." In a talk before the 1959 annual convention of the National Sand and Gravel Association, Mr. Wingo pointed out these facts, adding that these materials are very saleable because plant production is quicker and much more easily controlled than mixing on the job site.

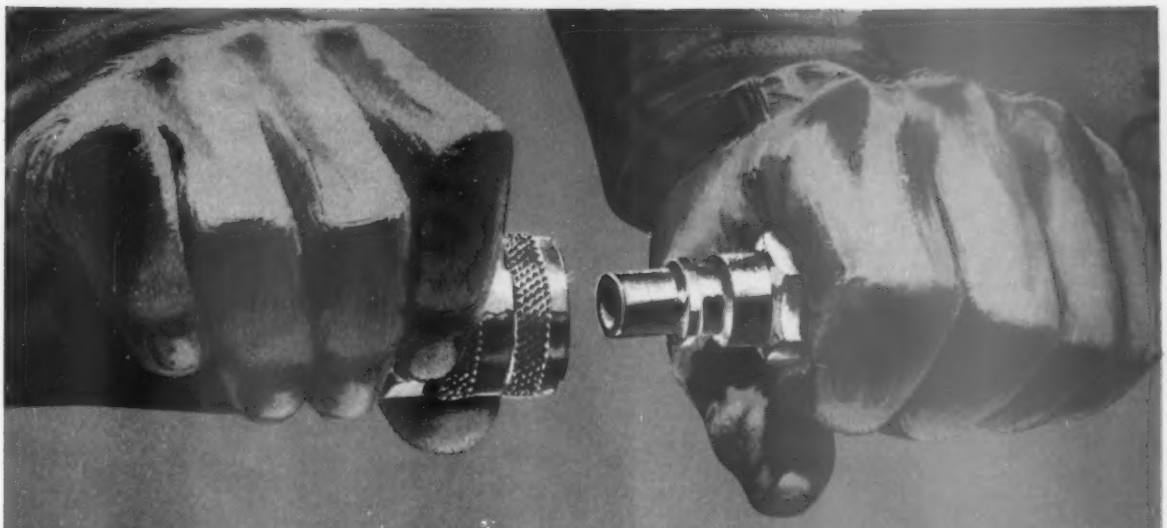
The scarcity of natural aggregates in many parts of the country stimulates the demand for stabilized base materials. Kossuth County, Iowa, six years ago found itself with only 12 remaining gravel pits with usable deposits, out of more than 100 worked in the past half-century. In fact, 15 of the county's townships were without gravel supplies by 1953. Hitting on stabilized road-base materials, the county engineer found that their higher bearing values permit using thinner courses, thus conserving scarce gravel. And the stabilized secondary roads were the only ones in the county to withstand a recent wet spring and summer.

Purchase of portable plants is enabling producers to compete effectively for Federal highway contracts in rural areas. With shipping costs making up the larger part of the total charge for aggregates shipped to rural markets, many roadbuilders are producing their own near the job in order to cut bid prices.

Warren D. Fish of the Bureau of Public Roads noted in a recent ROCK PRODUCTS article that many contractors are today literally forced to make their own aggregates with portable plants. Then, on subsequent jobs near existing commercial plants, they continue to produce their own stone and gravel, since the necessary equipment is available and can be profitably amortized in this way.

The solution? Mr. Fish feels that commercial producers aren't aggressive enough in getting to know their state highway officials and road contractors. These men have the necessary information on upcoming contracts to be let, and can help producers plan ahead for this business. He believes that, armed with their own portable plants, the commercial producers should aggressively go out into new market areas and seek the large-volume road business.

One producer doing just that is Grand Rapids Gravel Co., Mich. This large producer finds its portable equipment ideal for moving to any of several small pits surrounding its headquarters city—many of the jobs being too small to warrant building a stationary plant in the area. Another use of the portables: to clean up worked-out pits when the old stationary equipment has been moved out. Usually a stationary pit plant requires several acres of land. Often thousands of tons of gravel can be taken from this space by the portable plant.



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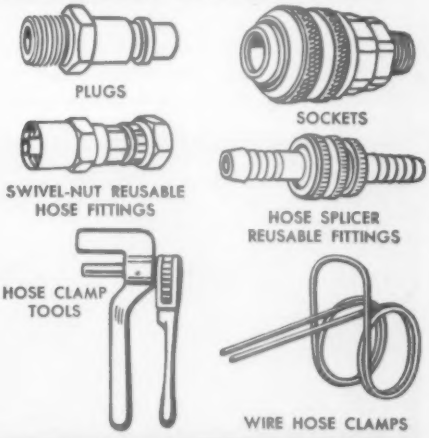

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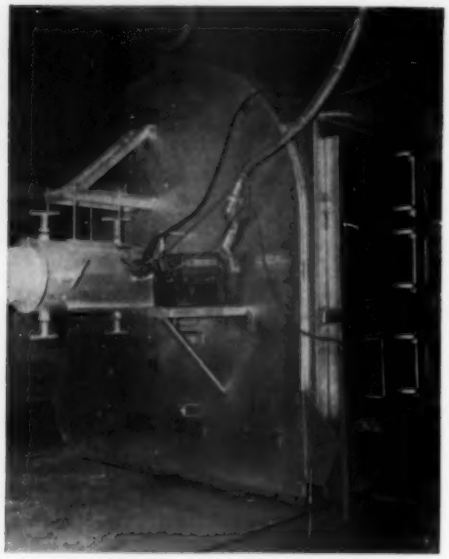
A "BLACK BOX" on the firing hood of the kiln watches the inferno inside the kiln and transmits the picture of what's happening there to the control room



LOOKING TOWARD THE KILN DISCHARGE END, the dust-free cement plant is as immaculate as any manufacturing plant

BRILLIANT LIGHTING EFFECTS emphasize clean-cut architectural lines of the new cement plant

Stackless, dust-free architectural gem
produces cement with battleship efficiency

Cement plant loses "factory look"

by Elwood Meschter

A MODERN CEMENT PLANT can be as smart and clean as any manufacturing plant. Proof of this is Ideal Cement Co.'s new $14-million plant near Albuquerque, N. M. Here is an installation of dramatic architectural beauty which houses a single kiln and cement-making machinery of the most advanced design.

But the dry-process 1¼-million bbl. plant in Tijeras Canyon cannot be quickly identified as a cement plant. It has no stack, no plume of dust and vapor—long-time sign and signal of the cement industry. Instead, a paneled building housing a huge bag collector takes care of kiln exhaust. Every part of the plant which might make dust is carefully vented to dust collectors. Rigid housekeeping procedures eliminate any dust which might elude the collectors.

Beauty and cleanliness are not accidental. The designers wanted to make the new plant a showplace of concrete construction. At the same time, it was designed to blend easily into the arid, rocky landscape. And it was designed to be an acceptable neighbor to the community and to the luxurious homes in nearby canyons. The immaculate plant can never be a hazard to the bustling, swelling metropolis of Albuquerque.

All buildings are enclosed in exposed aggregate mosaic panels of lightweight concrete. Most structures are topped with gracefully curving barrel-shaped roofs of lightweight concrete. Prestressed beams carry the belt conveyor system arching between lofty cylindrical storage silos.

Cleanliness is achieved with no less than 33 dust-collecting systems. Biggest of these is the silicone-impregnated, glass-fiber bag system taking care of the kiln exhaust gases. Next largest is the pair of cyclone collectors ahead of the bag collector stripping the heavy dust from the kiln vapors. Another pair of cyclones takes care of the dust from the clinker cooler.

All of the dust gathered in the collectors is immediately returned to the flow of material. This conserves materials and helps maintain the exceptional efficiency of the operation. The kiln-dust system does have an alternative method of handling dust to collecting hoppers for disposal, but normally all dust from cyclones and bags is returned to the kiln-feed system.

The site at Tijeras is a choice spot for a cement plant. It is near Albuquerque, hub of a network of highways which radiate to all parts of New Mexico. A truck-to-rail terminal at Calvert, about 20 miles away, gives the new plant access to markets with rail service. But most important, it is on top of a vast deposit of limestone which comes close to kiln-feed analysis as quarried. Selective quarrying provides the plant chemist the first opportunity to balance the cement making ingredients, limestone, alumina and silica to make all types of cement required by Ideal's customers. A small amount of iron is purchased from a chemical plant, and local gypsum is readily available.

The limestone formation dips about 17 deg. eastward, with the high calcium stratum on top. The middle segment is kiln-feed rock, while the lowest stratum carries more of the silica and alumina.

Since the quarry is close to the plant, only two of the three 15-ton, rear-dump trucks are regularly used to haul limestone. They are loaded with a 2½-cu. yd. electric shovel which works a 30-ft. face.

Primary crusher is a double-impeller unit, fed from the truck dump hopper with a heavy-duty manganese apron feeder. This 350-tph. crusher was selected to make a maximum amount of fines from the run of quarry feed. Minus 6-in. rock from

Please turn page

CEMENT PLANT LOSES "FACTORY LOOK," *continued from p. 103*

the crusher is dropped to an inclined belt conveyor for the trip to a pair of vibrating screens which take out minus ⅜-in. fines. Oversize is conveyed back to an impactor to be reduced to fines that are recycled to the vibrating screens. Accepted fines are taken to the top of four storage silos on a 650-ft. belt conveyor.

The four raw material storage bins are in the same storage group with the clinker storage silos. This arrangement concentrates all materials ahead of the two mills in the mill department. Raw materials are in one row of four silos, the clinker in another row of silos.

An unusual but extremely simple system distributes cement rock to the four silos. The main conveyor discharges into a steep chute with a bifurcated bottom. One leg of the chute directs the flow of material into a silo, the other leg to a short, inclined belt conveyor. When this conveyor is not moving, all material goes into the silo; when it is operating, most of the material is carried to the next transfer point.

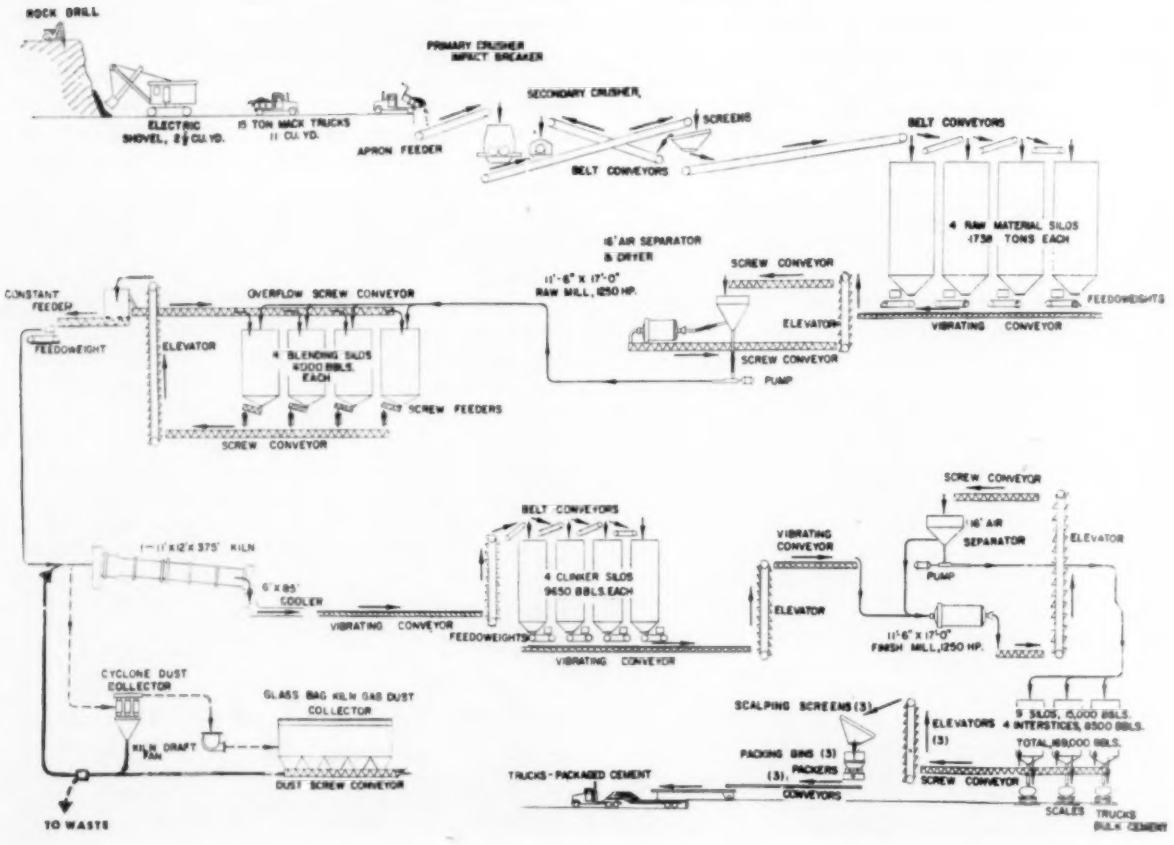
Each distribution point has a hood to collect dust. A bag collector gathers this dust and returns it to the system.

Additives—gypsum and iron oxide—are brought into storage with an independent conveying system after being delivered to the plant by truck. Gypsum is dumped into a hopper with an apron feeder ahead of a small single-roll crusher. Iron oxide is very fine; it is dumped from a bottom-dump truck into a covered hopper. A bucket elevator lifts these additives to the top of the raw material silos where a screw conveyor distributes material to one of the three interstices.

Two parallel oscillating conveyor systems serve the mill department. In one line are two of the oscillating conveyors that bring raw materials to a 11½ x 17-ft., single-compartment ball mill. Limestone and iron oxide are metered out of storage

Please turn to page 106

FLOW SHEET OF IDEAL'S TIJERAS, NEW MEXICO, PLANT



"Profitable production" through modernization

Modernizing toward *profitable production* differs from plant to plant. In some plants it calls for starting from scratch with a complete replacement of equipment. In other operations, the answer lies in supplementing existing equipment and/or developing a more efficient flow. In all cases prime consideration should be given such factors as reduction of fuel consumption, power demands, maintenance.

Help for you... Allis-Chalmers manufactures a most diversified line of processing machinery and electrical equipment. Each product department is staffed with research, design, manufacturing and application specialists. A "heads-together" approach — an interdepartment exchange of ideas and the correlation of specific skills — paces the solution of each modernization problem. In short, integrated thinking, planning and engineering precede the integration of equipment.

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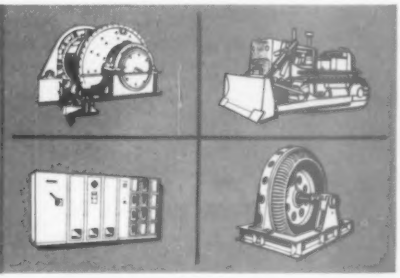

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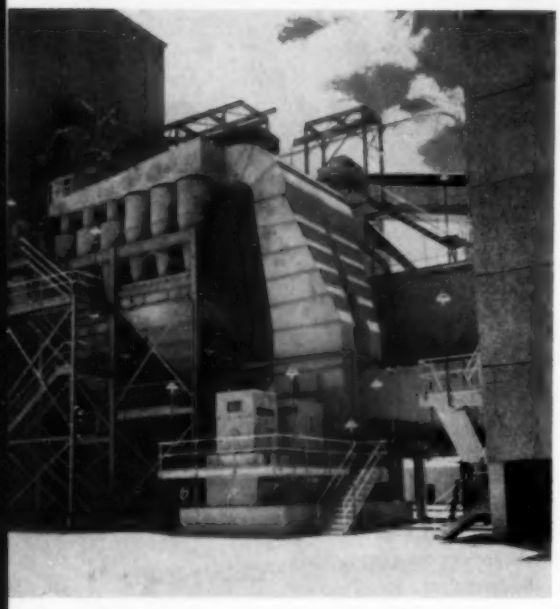


KILN EXHAUST GAS goes through this primary cyclone collector before it is finally stripped of all dust in the glass bag collector building to the right

silos into the conveyors with weighing feeders. This is the point where any blending is done to suit the type of raw mix in process.

Limestone mix for the raw mill is elevated to the top of a 16-ft. air separator-dryer system to take out minus 200-mesh fines ahead of the ball mill. Milled stone is conveyed to the bucket elevator to be recycled through the separator.

Another pair of oscillating conveyors in line brings clinker and gypsum to a second 11½ x 17-ft., single-compartment ball mill. These also are metered out of silos with weighing feeders. Limestone to make masonry cement is brought over to this system with a cross belt fed from the first silo in line. This is the only limestone silo with two weighing feeders.

Clinker from the silos is handled in a similar parallel system, except that all material is first passed through the mill ahead of the separator. Oversize cement clinker is recycled through the mill, while finished cement is pumped to storage.

Finely ground dry raw materials are pumped to one of four kiln-feed silos, each holding about 800 tons. The contents of each silo are checked and analyzed before they are fed to the kiln. Aeration nozzles under porous concrete plates at the bottom of the silos mix the material thoroughly before it is withdrawn with a screw feeder.

A long screw conveyor takes kiln-feed material to an elevator which lifts it to the top of a constant-head feeder. There are two of these units above the feed end of the kiln; one is a standby.

The constant-head feeder is a tank, kept full by the bucket elevator. Material is withdrawn through the bottom with a triple-pitch screw feeder in a tubular trough, weighed in a weighing feeder and, finally, dropped into the kiln. Excess material in the tank overflows to a screw conveyor to be returned to the same silo from which material is taken.

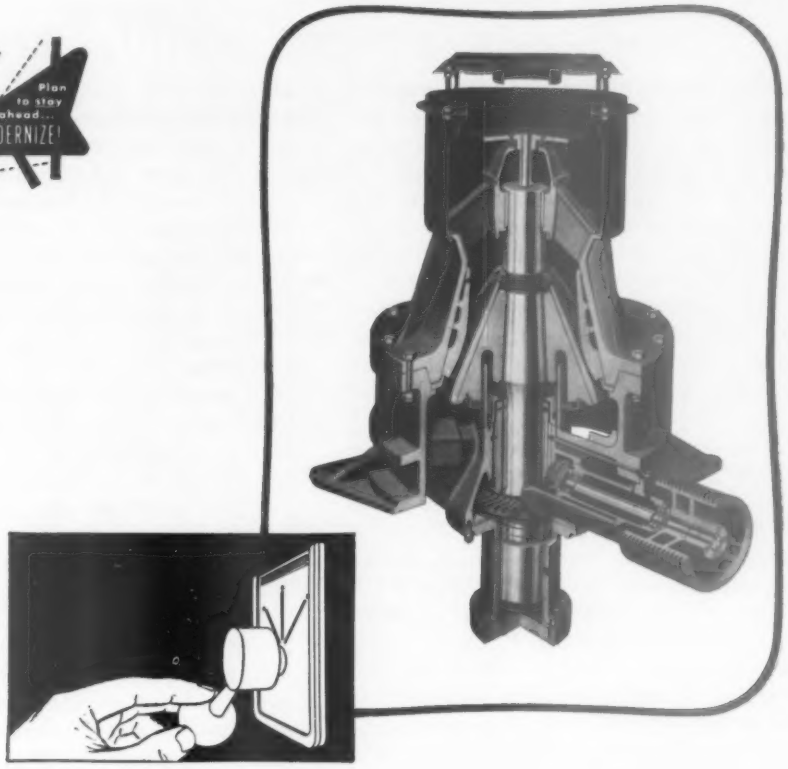
The kiln is an 11 x 375-ft. unit. The first 50 ft. is 12 ft. diam. to reduce dust loss and the kiln tapers down to 11-ft. diam. for the last 325 ft. Natural gas is the regular fuel, but Bunker C oil is available as standby. Kiln speed is about 80 rph. with a dual drive arrangement. In an emergency, a generator provides auxiliary electric power to turn the kiln about 10 rph.

Television monitors the firing end of the kiln. An industrial TV unit is mounted in the firing hood; it lets the burner see far into the kiln and to observe the flow of incandescent clinker as it approaches the discharge end.

The TV screen is in the air-conditioned control room right next to the firing floor. All equipment in the cement plant is controlled from this room, and the burner can make whatever changes and adjustments in the flow of material are needed to correct kiln conditions. A lighted flow diagram indicates all operating machinery. Safety interlocks and relays signal trouble anywhere in the system, and the relays stop machinery in sequence in event of any difficulty.

Exhaust gases from the kiln are carefully controlled to suppress every trace of dust. Enough ambient air is introduced at the exhaust end of the kiln to drop the exhaust temperature from about 1,300 deg. F. to about 650 deg. F. The flow is split between two banks of 12 cyclone dust collectors that take out coarse dust. This dust is gathered by a screw conveyor system and taken either to the truck-loading hopper or back to be recycled in the kiln-feed system.

A single large exhaust fan pulls gases from the two collectors and pushes them through 10 sections of silicone-impregnated, glass-fabric bags, a total of 1,280 bags. Dust-laden vapor is distributed through a branched header into the hopper bottom of each bank of collectors. *Please turn to page 108*



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CEMENT PLANT LOSES "FACTORY LOOK," *continued from p. 106*

Bag cleaning is done by reversing the pressure on the fabric. Air-operated dampers under the bags close off the duct leading into each hopper. Suction in the bags is obtained with a small fan pulling through an auxiliary duct from the bag hopper which is opened as the main duct is closed. Each of the 10 sections of bags is cleaned automatically in a timed sequence.

As each bag collapses, the dust which is attached to the inside walls drops to the bottom of the hopper. A screw conveyor system gathers the dust and takes it to a storage bin or to the kiln-feed system.

There are no dampers on the tempering fan or the kiln draft fan. Instead, speed is controlled through a magnetic clutch between the fan motor and fan. A thermocouple in the kiln exhaust duct senses the temperature of the gas stream. Acting on a signal, the magnetic clutch maintains a fan speed to draw in enough outside air to maintain the desired temperature, 650 deg. F.

The magnetic clutch on the kiln draft fan can be controlled by a thermocouple at the exhaust end of the kiln, by pressure, by a fuel-air ratio or by conventional manual controls. These alternatives give the burner great flexibility in operating the kiln.

Clinker is handled in one of two conveying systems—the other is a standby system. First unit is an oscillating conveyor from the clinker crusher to the foot of a bucket elevator. This elevator lifts the clinker from below ground level to the top of the silos. Here an inclined belt conveyor brings the clinker to a distributing belt system similar to the raw materials system, and clinker is distributed to one of four storage silos.

An overflow chute permits the system to drop clinker to the ground in a long chute. Here it can be trucked away or distributed in a ground storage pile. When clinker is to be reclaimed to the system, it is simply bulldozed to an elevator hopper and lifted back to a distributing belt over the clinker storage silos.

Finished cement from the mill department is pumped to one of nine silos, arranged in three banks of three and holding a total of about 169,000 bbl. of finished cement. Each truck is loaded by gravity from a silo directly above.

A single scale platform 140 ft. long under each group of three silos provides rapid weighing of each loaded truck. The scale itself is electronically operated to assure that trucks are not overloaded and that the correct weight is printed on a card. This card is sent pneumatically to the packhouse office to be recorded as an inventory check; another pneumatic tube system takes the card to the plant office for billing.

Last stop inside the plant for the hopper-body trucks hauling cement through Tijeras Canyon is at an automatically operated gate. When an outgoing truck stops on the gate's treadle, the gate rises and permits it to pass. **END**

THE KILN BURNER is hard at work looking at TV when he regularly checks burning conditions in the kiln. Practically the entire operation of the plant is controlled from this air-conditioned room on the firing floor

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Dust collectors (28)	Northern Blower Co.
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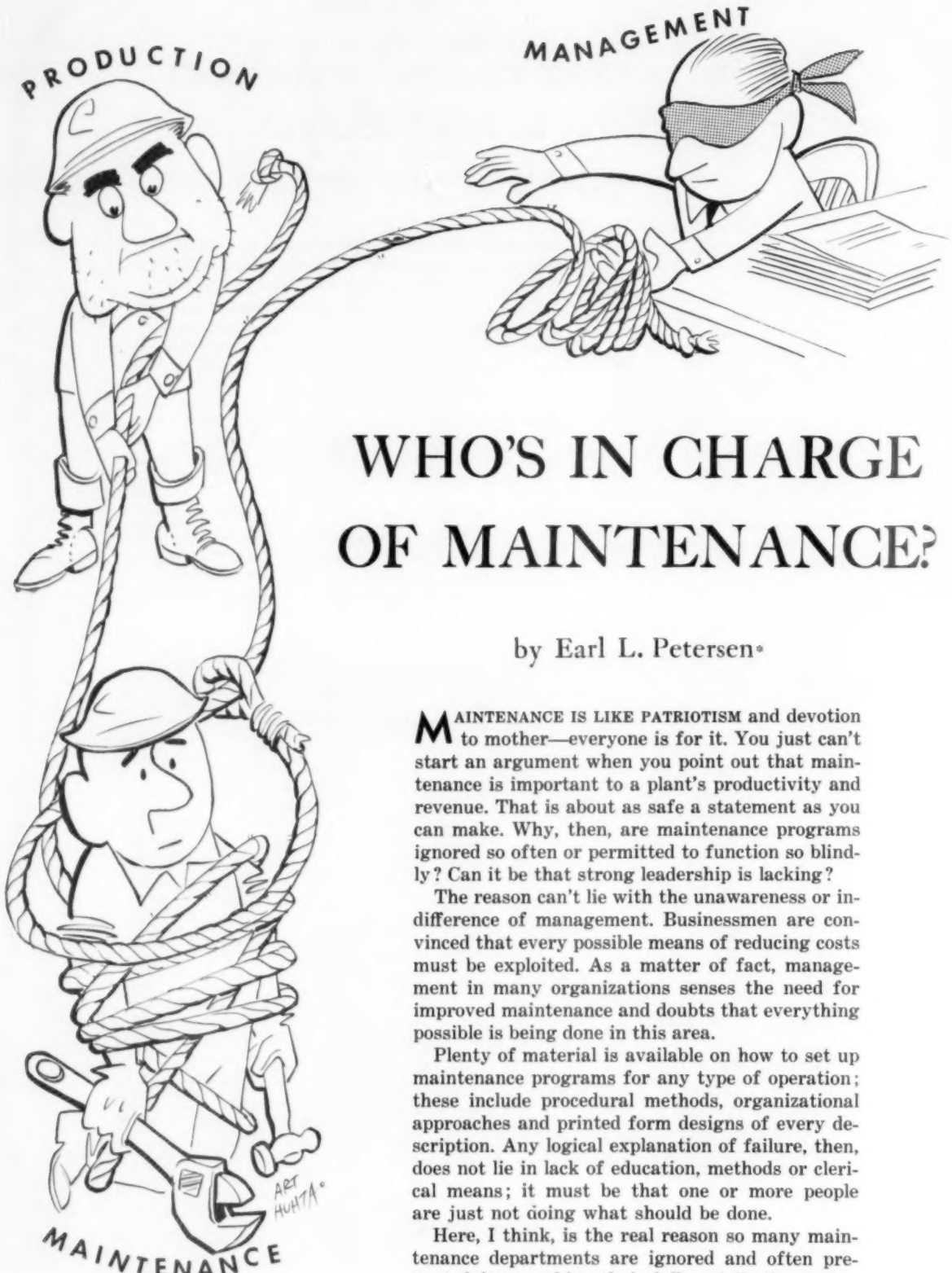

WHO'S IN CHARGE OF MAINTENANCE?

by Earl L. Petersen*

MAINTENANCE IS LIKE PATRIOTISM and devotion to mother—everyone is for it. You just can't start an argument when you point out that maintenance is important to a plant's productivity and revenue. That is about as safe a statement as you can make. Why, then, are maintenance programs ignored so often or permitted to function so blindly? Can it be that strong leadership is lacking?

The reason can't lie with the unawareness or indifference of management. Businessmen are convinced that every possible means of reducing costs must be exploited. As a matter of fact, management in many organizations senses the need for improved maintenance and doubts that everything possible is being done in this area.

Plenty of material is available on how to set up maintenance programs for any type of operation; these include procedural methods, organizational approaches and printed form designs of every description. Any logical explanation of failure, then, does not lie in lack of education, methods or clerical means; it must be that one or more people are just not doing what should be done.

Here, I think, is the real reason so many maintenance departments are ignored and often prevented from making their full contribution to im-

Please turn to page 112

*Chief Industrial Engineer, Paul Weir Co., Chicago

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WHO'S IN CHARGE OF MAINTENANCE?

continued from p. 110

proved productivity and greater profits: Management fails to recognize the contest that develops each time it is necessary to get a new idea into an organization. Many agree with me that this is so. Unless management understands this problem and constitutes itself as part of a dynamic sales team for effective maintenance, none will ever exist.

There are always hard-boiled production men unwilling to coordinate their activities with those of progressive maintenance; many even treat it as a relatively minor function to be called upon only when some repair is required. They are sometimes unwilling to admit the extent of its importance and that it must be fully integrated with all other activities. People of this type present a definite challenge to the person in charge of maintenance.

The maintenance superintendent, plant engineer or master mechanic—whoever directs the maintenance program—must be willing to risk taking some positive stands. True, it is easier to continue the status quo and avoid the contest that so often occurs between a new or better method and an organization's resistance to change. A bitter experience with such resistance may seem reason enough to suggest few or no further departures from the existing arrangement. Yet, if management is to support and act as a sales team for improved maintenance, the maintenance department must provide the sales material. Few maintenance departments, by themselves, can assure a completely successful maintenance program with its full profit-making potential. Nevertheless, they must lead the way.

Regardless of the organization or the complexity of the maintenance program, there appears over and over again a common requisite for its efficiency and effectiveness. It is a certain quality in the manager or chief of maintenance. It is that demonstration of dynamic leadership which not only directs a strong maintenance program and gets the best from maintenance personnel, but also is strong enough to overcome every hindering interdepartmental relationship or activity. It means demonstrating such a positive objective force that the entire organization recognizes its value and deservedly gives it full respect and cooperation. That, of course, is never easily done, nor is the maintenance chief going to win the popularity contest while he is doing it, at least in the beginning.

When are such changes or the introduction of new procedures and controls ever popular? It is true, of course, that a firm fighting for its very survival can exact almost any measure with little or no resistance. However, those are rare cases and few firms operate in such an atmosphere. On the other hand, there is always more profit to be gained from new and more effective cost-reducing measures when business is good than when business is bad. But, when business is good, we are likely to be a bit more reluctant to do things that may be unpleasant; we are inclined to choose the lines of least resistance; we don't want to hurt anybody and are inclined to do only what we are actually forced to do.

If we are to have effective maintenance, someone must step forth with the appropriate action, regardless of any opposition or how distasteful the job may be. We all agree that good human relations is just good business. But, whenever something new and constructive is not done because people are afraid of not being good fellows; that is neither sound human relations nor good business. There should always be an atmosphere of friendliness, but there also must be complete respect.

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Earl L. Petersen, Chief Industrial Engineer for the Paul Weir Co., Chicago, is a native of Wisconsin and obtained his entire formal education in that state; however, his various positions have also required his residing several years each in the states of Michigan, West Virginia and Illinois.

He has held positions as Production Manager and Chief Industrial Engineer in both single and multi-plant organizations, which have involved a wide variety of products and industrial processes. His present position with an established consulting firm has extended this experience to the field of mining and its allied activities.

Mr. Petersen has directed every activity associated with the above positions and, more recently, has done considerable work developing realistic practices for the effective administration of various size and type maintenance activities. His work has taken him into almost every phase of cost reduction including those associated with management and the instruction of supervisory personnel.

B.F.Goodrich

B.F.Goodrich tires handle the tough jobs at mammoth Niagara Power Project

UNDER construction at Niagara Falls, N.Y., are the powerhouse, waterways, reservoir and intake—all part of the gigantic $720-million Niagara Power Project. Shown above: site of 110′ x 50′ excavation for one of the twin, 46′-wide, covered intake conduits. On the job: a fleet of trucks equipped with B.F.Goodrich tires and owned by Merritt-Chapman & Scott Corporation, largest contractor on the project.

These trucks haul ton after ton of rock and overburden from the excavation to the spoils area, work round-the-clock, 6 days a week, under severe operating conditions. In spite of this, B.F.Goodrich Rock Service tires are still going strong after 3,135 hours of service!

The Rock Service tread is specially-compounded to resist rock cuts and snags. Massive double-chevron cleats give extra traction in forward or reverse. Thanks to the special B.F.Goodrich FLEX-RITE NYLON cord body, Rock Service tires are virtually immune to heat blowouts and flex breaks. Result: you get longer tire life—more retreadable tires!

Other B.F.Goodrich products at work on the Niagara Power Project are conveyor belting, air hose, protective clothing and footwear. Maintenance and service programs for tires and industrial products are also in operation—all part of the new B.F.Goodrich Unified Contractor Program. No matter what your off-the-road job, B.F.Goodrich is ready to serve you—and help you save. Your Smileage dealer is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Co., Akron 18, Ohio.*

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WHO'S IN CHARGE OF MAINTENANCE?

continued from p. 112

The success of modern maintenance, then, requires both active management support and a capable leader willing to direct its cause regardless of business conditions or organizational obstacles.

Good maintenance invariably costs less than poor maintenance. However, in the process of converting poor maintenance into good maintenance, it is very often advisable to temporarily incur additional expense. After all, with breakdowns occurring faster than repairs can be made, the maintenance department has not time for planning or implementing new practices and must use all of its labor as each moment demands, regardless how inefficient the action from the long-term standpoint may be. Second, and even more important, because such breakdown-type maintenance is already very costly and because the department cannot keep up with the already existing maintenance work load, no one is in the mood either to suggest or accept the additional measures and the possible added expense required to convert to the more efficient practices. Thus, many maintenance programs are unnecessarily delayed or postponed. Yet, every delay or postponement costs money.

Any maintenance department that finds itself barely able to keep up with the repair of breakdowns and with a high percentage of emergency breakdowns is already a "high-cost" maintenance department, in spite of what the cost records may indicate. Under such conditions, repair jobs must be made hurriedly and only to the extent allotted time will permit. This practice so often results in many of the same repair jobs being done over and over inasmuch as time does not permit the first repair to be performed correctly. The result can only be wasted labor and excessive downtime. But with the right chief of maintenance who is an integral part of a fully informed cooperative management team, the deciding analysis and the full implementation to the agreed practices need not be difficult.

The prime intent of any maintenance program should not be the cutting of maintenance costs alone. Instead, it should include plans to attain that level of maintenance and to establish such relationships with other departments that the lowest possible product costs will result. In spite of the over-all objective, no maintenance department will receive the proper cooperation and support for attaining that objective unless it first puts its own house in order and makes sure that its own functions and activities are performed most efficiently.

Now, the nature of general maintenance activities is at best quite variable, and the outstanding work load fluctuates widely from day to day. Thus, if any degree of efficiency is to be attained, there must be active planning and effective control. On the other hand, such planning and control cannot be just a clerical function. Its effectiveness and the extent to which it affects the efficiency of all maintenance activities depends almost solely upon the supervisory ability of the maintenance chief. Unless that person has the ability to demonstrate strong leadership, he can expect maximum performance and efficient use of labor and supplies to be slow to occur.

The very nature of the many maintenance activities strongly influences production costs; therefore, such dynamic administration of maintenance can be of even greater value than the same quality is to the direction of individual operating departments. It is costly to train new maintenance men to maximum effectiveness. Good all-around maintenance men are becoming increasingly harder to find. These are further reasons for emphasizing the need for capable maintenance supervision.

To many firms, the efficient use of maintenance labor is so important that the application of wage incentive plans is being given serious consideration. Some firms have even been most successful with maintenance wage incentive plans and have built up extensive elementary data tables for a wide variety of applications. Yet, it has been proven that such plans are rarely effective unless there already is a highly-skilled supervisory force capable of administering them. There are many things that incentives will not do. In fact, it is even possible that their installation will create new problems without solving any that already exist. Yet, the issue is not the merit of such plans, but the importance of good supervision.

The care or treatment of equipment by production operators is another phase of a complete maintenance program that cannot be overlooked. Don't forget that even a good maintenance department's effectiveness and over-all contribution to profit can be sharply reduced by avoidable or unnecessary abuse of equipment by operating personnel. One ordinarily assumes that the corrective measures for dealing with such abuse are the sole responsibility of the operating departments. It should be, but one must also realize that more often than recognized, production is obtained with too little regard for the equipment used. Some production foremen have even been known to comment, "My

Please turn to page 136

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By installing mechanical controls, Riverside Cement has taken the guesswork out of raw materials blending and storage

Computer masterminds raw materials blending

by Ralph S. Torgerson

A NEW FRONTIER in automated cement making has just been crossed by Riverside Cement Co. at its dry-process plant at Oro Grande, near Victorville, Calif. By installing mechanical controls that take the guesswork out of raw materials blending and storage, the company has achieved a standard which long has been the goal of cement men—complete uniformity of material fed to the kilns. This is a big step forward in production of consistently uniform, high-quality cements and leads the way to improvement of kiln efficiency, as well as complete automation of kiln control.

Riverside, a division of American Cement Corp., spent $5,750,000 for its new rock crushing and storage facility. Designed for a capacity of 24,000 tpd. based on 24-hr. operation, the system comprises two stages of crushing reduction, an automatic rock-sampling station and a completely automatic belt conveyor stacker and reclaimer. Proportioned blending of raw materials as they are stacked is made possible by three principal control features:

- A digital computer which, when given the quantity, chemical composition and point of origin of the limestone and other raw materials delivered to the blending facility, calculates how much of what kinds of raw materials should be added to the pile to obtain proper proportions of kiln feed.
- An unusual pneumatic tube system which carries raw material samples in cartridges from the sampling station to the laboratory in a few seconds.
- An X-ray spectrometer which analyzes raw material samples at the plant laboratories. (For an account of Riverside's use of X-ray analysis, see ROCK PRODUCTS, March 1958, p. 90.)

From data developed by the digital computer's linear programming technique, materials are selected and delivered to the automatic stacker. Traveling the length of each stockpile, the stacker places materials in a series of layers. This is the first use in the cement industry of the traveling stacker, which has been employed successfully for some years in the Florida phosphate industry.

Other raw materials, such as clay, shale or other argillaceous material and iron ore, are added at any time to provide a completely blended raw mix pile available for delivery to the raw grind department. Each of the four stockpiles is 36 ft. high x 517 ft. long and contains approximately 35,000 tons—enough for seven days' operation.

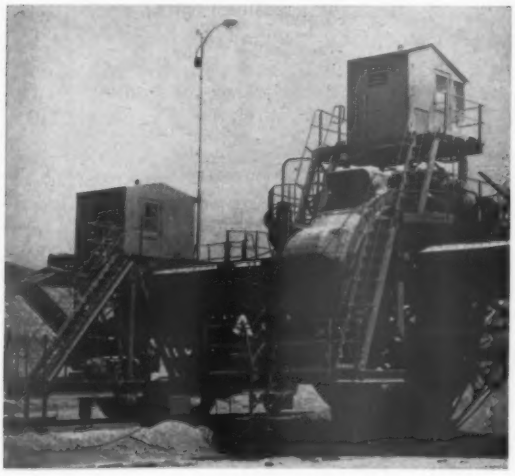
Besides serving its basic purpose, the system shortens hauling distance from deposits to crusher by approximately ¾ of a mile through the use of long belt conveyors which allow for wide separation of crushing facilities from the rest of the plant.

The short run from quarry to primary crusher is made by 35-40 ton capacity rear-dump trucks and by 35-ton capacity truck-and-trailer units. They deliver raw material up to 60-in. maximum size to a 60-in. gyratory crusher. The crusher reduces the rock to minus 7 in., discharging into a surge chamber directly below. An adjustable-speed wobbler feeder draws material from the surge bin onto a 48-in. belt conveyor which feeds a 500-ton surge bin. This bin serves as a connecting link between the first and second-stage reduction, and provides sufficient material for continuous operation should there be a temporary shutdown of the primary crusher. Before material from the primary crusher reaches the surge bin, it passes through a sensing coil of an iron "detramp" unit.

Please turn page

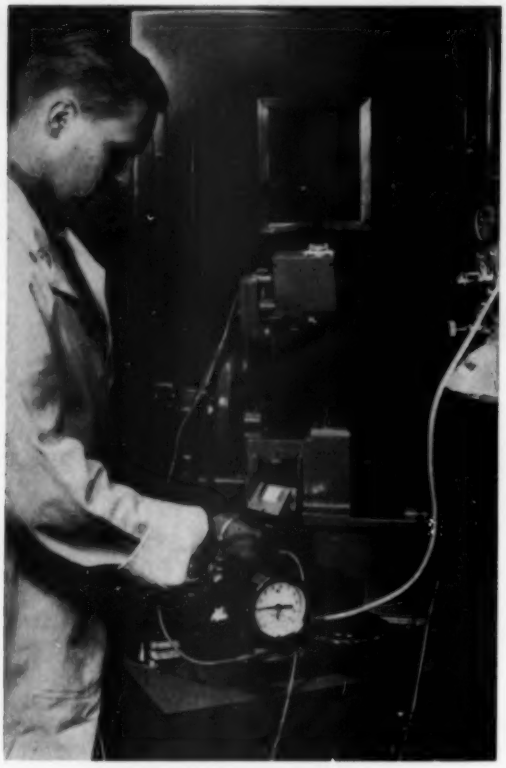
THIS IS THE COMPUTER which stores and analyzes information to control the blending operation at Oro Grande. Location and analysis data are fed to the machine on a paper tape

BLENDED KILN-FEED MATERIALS are reclaimed at a rate of 300 tph. with this machine. A digging wheel mounted on the conveyor frame travels across the pile as the bridge slowly moves forward into the material



THE NEW BLENDING AND STORING SYSTEM for limestone dominates the landscape of the Oro Grande plant when seen from the air

COMPUTER MASTERMINDS RAW MATERIALS BLENDING, *continued from p. 117*



X-RAY ANALYSIS of raw materials provides the information needed by the computer to do the work

All equipment in the primary crusher station is started individually from a central control panel, and is completely interlocked electrically to provide proper sequence of starting. A control panel alarm for the operator indicates equipment failure in addition to high rock level in the surge chamber below. Red and green signal lights operate in conjunction with the alarm system to signal truck operators when to start and stop dumping into the primary crusher. The red "Stop Dump" signal light operates in response to a high raw material level in the surge chamber, failure of any piece of equipment in the sequence, and low pressure or high temperature of gyratory crusher lubrication oil. High temperature or low pressure in the gyratory crusher lubrication system also actuates a one-minute, delayed-action shutdown relay to allow the crusher to empty before stopping.

Every effort is made to reduce dust at the primary crusher. In addition to the use of a bag-type dust collector, the top of the gyratory crusher is equipped with spray units to wet down the dust during and shortly after trucks dump their loads from the quarry.

From the 500-ton concrete silo-type surge bin, the 7-in. maximum size material from the primary crusher is drawn from the bottom by two automatic remote controlled vibrating feeders and passed over a belt scale where tonnage is weighed and the feed rate regulated before discharging to the 42-in. belt conveyors inclining up to the secondary crusher building.

At the secondary station, the material is placed over two 6 x 14-ft., double-deck vibrating screens with the minus $\frac{3}{8}$-in. fines going directly to the finish product belt conveyor and the oversize chuted to two hammermills. The product of the hammermills is conveyed to a second set of screens where fines are again directed to a finished product belt conveyor and the rejects returned to the hammermills.

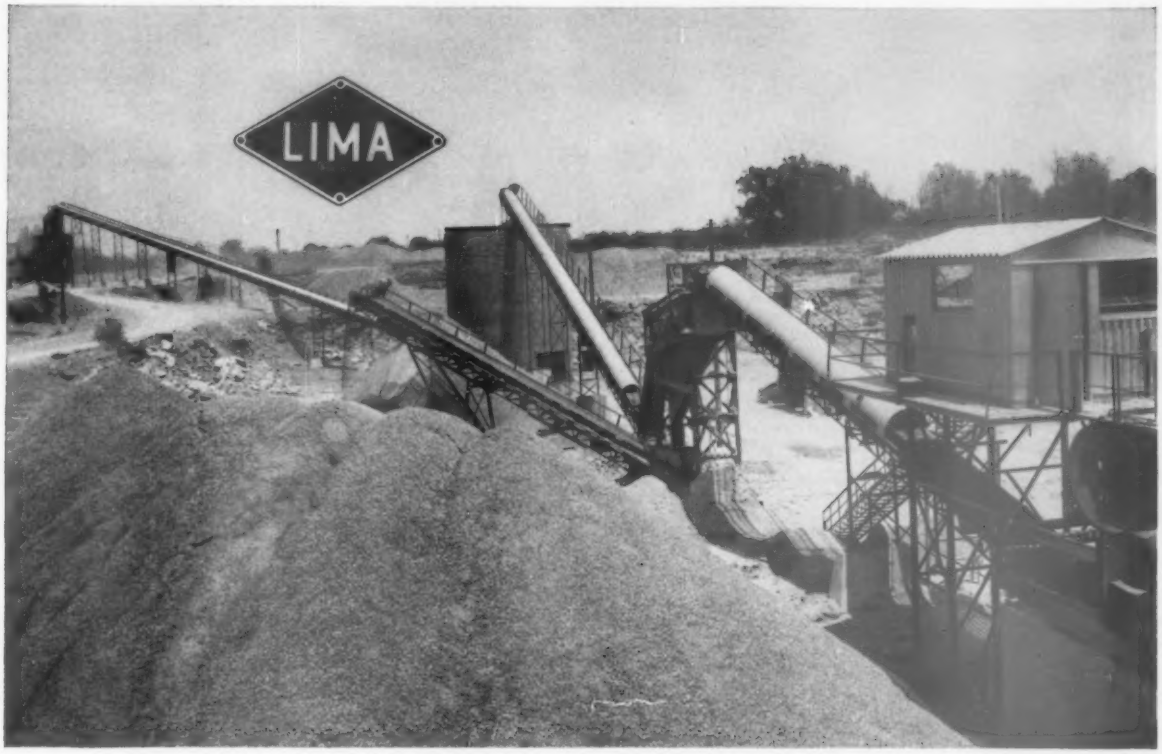
The vibrating feeders drawing material from the surge bin are controlled through contact-making ammeters in each hammermill circuit which signal to the belt scale beam device to increase or decrease the feed. The scale beam device controls feed by adjusting the field rheostat on the vibrating feeders.

A central control panel on the second floor of the secondary crushing building controls the operation of all equipment in this structure. To start up either hammermill and its related equipment, a single pushbutton activates a timing cam switch which, in turn, starts all conveyors, screens, dust arresters and hammermills in proper sequence. As the system is completely interlocked electrically, the stoppage of any piece of equipment will stop all preceding equipment to prevent spillage or plugging.

A single button for each hammermill and its auxiliary equipment controls relays that permit the system to empty itself before shutting down. Duplicate controls for this purpose are also located at the primary crushing station and the rock sampling station. Like the primary crusher control panel, the secondary control panel has an alarm for the operator in case of trouble shutdown in either primary or secondary crushing stations.

Material from the secondary crushing station is moved by belt conveyor to the sampling station. Because compositions of limestone from the quarry differ widely, the material is continuously

Please turn to page 121



Stationary Lima A-W installation, equipped with 32 x 40 in. primary jaw crusher, produces materials to 10 specifications. Conveyor covers help hold down dust, prevent materials from falling.

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Lima Austin-Western offers a complete line of portable and stationary crushing and screening plants. Designed and quality built to set new standards of high-volume production of accurately sized gravel or rock over long years of trouble-free service.

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COMPUTER MASTERMINDS RAW MATERIALS BLENDING, *continued from p. 118*

sampled before it enters the blending and storage area. Sampling begins with a sample cutter which moves back and forth in the material. These samples are discharged into a rotary feeder which feeds an air-swept roller mill. The feeder is controlled by pressure differential across the mill which activates the pneumatic electric control. Mill fines are swept up through a cyclone separator and discharged through a second sample cutter, resulting in a thoroughly mixed average of the rock that has been conveyed into the storage area for a specified length of time. As the sample represents a measured tonnage of material, it is possible to calculate the amounts of other materials needed to build a blended raw mix pile.

Raw material sampling equipment is started individually from a central control station. Here an alarm has been installed which will sound in case equipment should fail. Dust is controlled at both the transfer building and the sampler station through the use of two dust collectors.

A PAIR OF CENTER-FEED IMPACTORS reduce limestone to kiln-feed size ahead of the sampling operation

In this sampler station, too, is located the digital computer referred to above. Following the processing of data as previously described, raw material from the sampler station is moved by belt conveyor to the travelling belt conveyor stacker. Operating over rails, the stacker delivers material over one or two boom conveyors. The boom conveyors step upward as the pile height increases and simultaneously shortens the stacker travel to slope the end of the piles. It takes about 15 min. to traverse the length of a pile.

Control of the belt conveyor stackers is either local or remote. With remote operation, the operator presets the stacker controls to remote control and thereafter starts and stops it by switching its power feeder.

All sampling and stacking operations are interlocked with the secondary crushing station, and must be running before the secondary crushing system can be started.

Material in the blended stockpiles is reclaimed by a specially developed bucket-type digging wheel with a capacity of 300 tph. The carriage operates on rails, with the digging wheel traveling across as it moves into the pile, thereby cutting a continuous cross section of the "sandwich" pile of blended raw material.

Raw mix material is delivered from digging buckets of the reclaimer by a transverse belt and onto a conveyor system for delivery to storage bins at the raw grind department. All conveyors are interlocked and dust arresting equipment is provided at the direction-changing transfer points.

The reclaiming operation also serves to mix the raw mix materials more thoroughly. The reclaimer or digging wheel may be controlled locally or from the sampler station control panel. Once the reclaiming belt conveyors from the storage area to the raw grind department have been started, the reclaimer will start and stop in response to bin level devices in the bins.

New facilities for handling clinker were constructed simultaneously with the storage and blending system. These will soon be placed in operation. Storage of clinker and method of reclaiming will be handled in the same way as the raw material system. Clinker will be moved by belt conveyor to the storage area where it will be

Please turn page

continuously sampled before being stockpiled. The sampler station will be similarly equipped with an air-swept roller mill and dust collectors. A total of 9 lb. per hour will be collected, representing an average of all material going into storage for that period. A complete analysis of what has gone into the pile will be known at all times.

Electrical features of the system are most important. A 12-kv. overhead line supplies power to the crushing department through two banks of 333-kva., single-phase transformers connected 12-kv. delta to a 1,385/2,400-v. wye. Distribution at the 2,400-v. level is by conduit and cable to the 350-hp. primary crusher motor and 2,400 to 277/-480-v. primary crushing department load center; also to the secondary crusher motors and 2,400-277/480-v. secondary crushing station step-down transformer. All motors are operated at 480 v. except the three crusher motors. Grouped motor control is used throughout.

A 2,400-v. underground feeder supplies power to the sampling and storage area. Power is received by a 1,000-kva., 2,400-v. delta to a 277/480-v. wye load center from which it is distributed directly to motors or to other motor control centers.

Dust protection of control equipment was given much consideration, as the plant is in a desert region with frequent dust storms. Sealed mercury contacts are used for all pushbuttons, relays and cam switches. Where mercury contacts are not available, such as the dust rapper contactors, a well-gasketed Nema 12 enclosure is used to prevent entry of dust. Mercury relays in parallel with motor starter coils provide interlocking to direct driven equipment. Belt conveyor interlocking is through zero speed switches driven by the tail pulley or idler near the tail pulley.

Belt conveyor stacker and reclaiming digging machines, with 120 and 100-hp. motors, respectively, traverse a distance of 600 ft. A 480-v., three phase line supplies power to these machines through 600 ft. of 250 MCM, 3-conductor cable which is paid out and retrieved by large motor-driven cable reels mounted on the machines.

Wherever possible, controls have been grouped at central stations for convenient operation. Both visual and audible indication are used for alarm and signaling devices. At some later date a closed-circuit television installation will be made to give the operator remote observation of critical points in the system, marking another milestone in Riverside's progress in turning out quality cement with the latest production techniques. **END**

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Trucks	
35-40-ton, rear-dump	LeTourneau-Westinghouse Co.
35-ton, side-dump	Autocar Co. International Harvester Co. Fruehauf Trailer Co.
Gyratory primary crusher, 60-in.	Allis-Chalmers Mfg. Co.
Wobbler feeder, 13-bar	Universal Engineering Corp.
Dust collectors	The Northern Blower Co. Western Precipitation Corp
Hammermills, 70-in. diam. (2)	Hammermills, Inc.
Vibrating feeders (2)	Jeffrey Mfg. Co.
Vibrating screens, 6x14-ft. double-deck	Hewitt-Robins Inc.
Sample cutter	Geary-Jennings
Roller mill, air-swept	Raymond Div. Combustion Engineering Inc.
Digital control computor, RW300	Thompson-Ramo-Wooldridge Products, Inc.
Traveling stacker Belt conveyors Reclaimer, 300-tph. bucket-type digging wheel	Hewitt-Robins Inc.
Control panel for secondary crusher building. Motors for conveyors and crushers	General Electric Co.

SAMPLED AND ANALYZED, raw materials are stockpiled continuously with this traveling stacker to make piles over 500 ft. long and 36 ft. high

General Electric X-Ray introduces a

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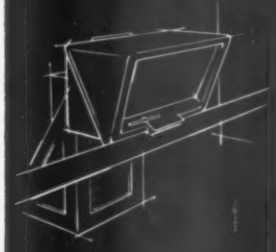

- gases
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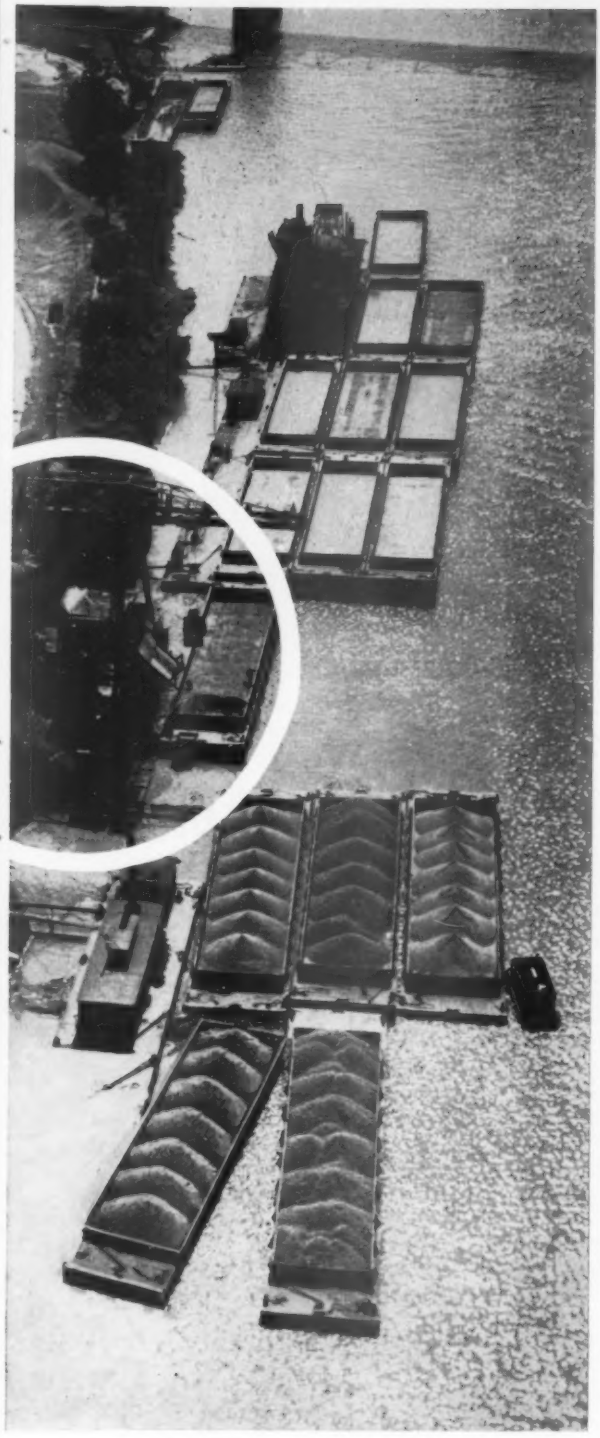
AERIAL VIEW of the Louisville yard shows barges being unloaded by big gantry, plus bin and ground storage of finished aggregate. The new classifier (circled) is placed near left end of craneway



New classifier cuts labor, shipping costs

by Kneeland A. Godfrey, Jr.

A 300-TPH. rising-current classifier, new to gravel but a coal industry veteran, is doing an outstanding job removing sticks and coal from the riverbottom gravel deposits of Ohio River Sand Company, Inc., Louisville, Ky. Formerly an expensive headache to remove, heavy concentrations of coal and sticks now are neatly picked out by a rising current of water running through the classifier.

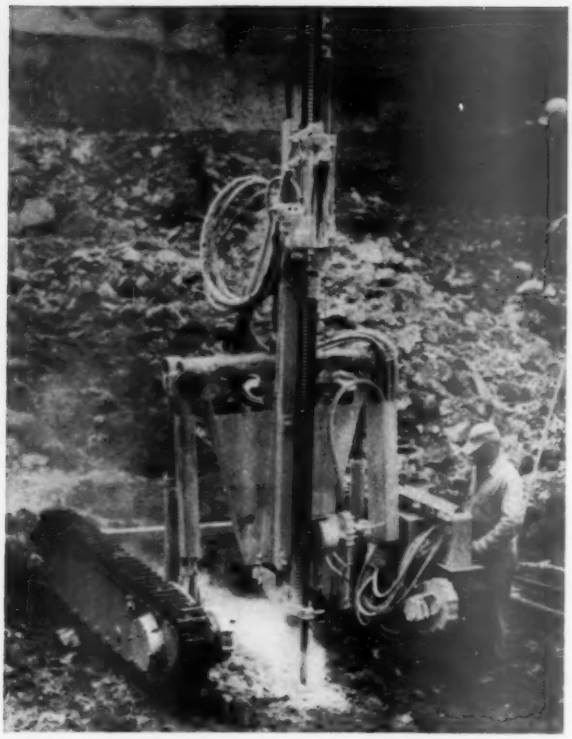
As explained by the chief engineer, Louis Seelbach, Jr., here's what the simple but highly effective unit does:

- It has cut manpower requirements. Formerly, Ohio River Sand had to put up to three men on a belt picking out the deleterious coal and sticks. Sometimes things go so bad they'd have to stop the stockpiling belt to give time for picking. No pickers are needed now.

- Formerly, the firm's big 300-tph. dredge, "Kentucky," had to roam as far as 90 miles up the Ohio to find suitable gravel for particular jobs. In the year the new classifier has been working, the dredge never has ventured more than a dozen miles upstream. Although their fleet of twenty-three 600-ton barges were inadequate previously, now some barges are put out on charter. Formerly, it took the firm's towboat, "J. H. Duffy," up to 30 hours to take empty barges to the dredge at points as far as 90 miles upstream and return with loaded barges to the storage yard at Louisville; now it takes no more than four hours.

Please turn to page 127

The 450-DR is available on several self-propelled carriers, including the completely automatic TDM Trac-Drill shown at the right.



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Let us prove the superiority of the new Joy 450-DR Drill. Your nearest Joy Office or Distributor will be glad to arrange a demonstration of this remarkable new drill.

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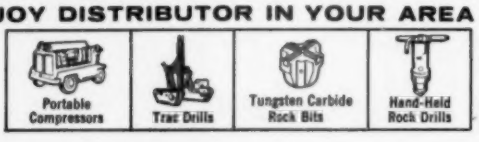

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NEW CLASSIFIER CUTS LABOR, SHIPPING COSTS, *continued from p. 125*

Coal and sticks have long been a problem with Ohio River Sand, but no satisfactory solution was found until one day a couple of years ago. On that day the management of the company heard of a rising-current classifier being used by Tri-State Materials Company, Parkersburg, W. Va. Here was another sand and gravel firm working river-bottom deposits. A quick trip up to Parkersburg proved their hopes to be correct—under conditions similar to those existing in the Ohio River downstream at Louisville, Tri-State was getting very good results with a 150-tph. installation of the classifier. So, about 18 months ago an order was placed for a unit twice as big for the Ohio River Sand plant. As noted, its performance has been outstanding.

The coal industry which contributed this technical development was a big cause of the problem in the first place. In the years before the first locks and dams were built on the Ohio, dozens, sometimes thousands, of barges loaded with coal from the Pennsylvania and West Virginia fields upstream were stored on the Ohio River at Louisville. They waited here for high water so they could pass the Falls of the Ohio. Over the years a great deal of coal was lost overboard and scattered on the river bottom. Too, trees and vegetation carried from distant vast wooded areas of the Ohio River basin accumulated and settled in the lower reaches of the river. Sunken wooden barges also contributed their share to the problem. In sum, the problem meant Ohio River Sand had to send its dredge all over the broad reaches of the river, picking and choosing to find gravel with small enough amounts of the deleterious materials (as well as industrial refuse and trash) to meet job specifications.

The classifier which solves the problem is simple. The big new rising-current unit processes all gravel unloaded at the Louisville yard. Once a day a tow of barges, usually six of the 600-ton capacity units, arrives at the yard ahead of the firm's towboat, the "J. H. Duffy." A big 5-cu. yd. clamshell bucket on a bridge crane goes to work immediately, lifting sized sand and gravel into a belt-loading

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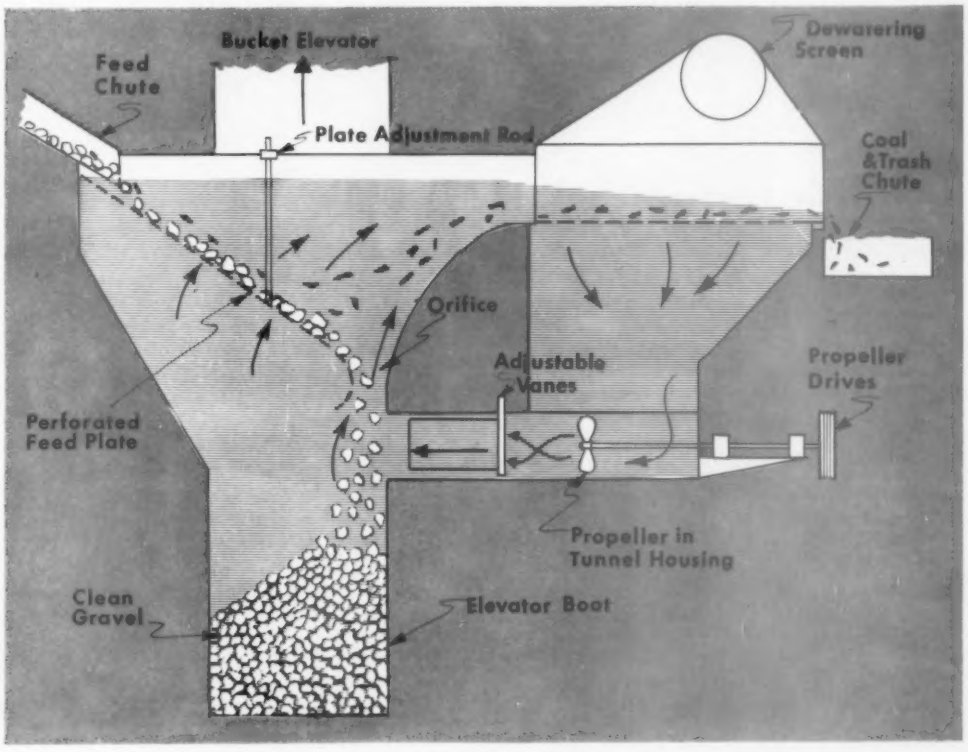

WATER rises through orifice in tank at left, lifts out lightweight sticks and coal. Angle of perforated plate (and width of orifice) are changed with plate adjustment rod

NEW CLASSIFIER CUTS LABOR, SHIPPING COSTS, *continued from p. 127*

hopper. Sand is sent directly to stockpile, while the gravel fractions stop enroute at the classifier.

In essence, the classifier takes advantage of the different settling rates of particles of different specific gravities (just as do heavy media separators and jigs). Heavier the particle, the faster it sinks. A controlled current of water rises up through the incoming gravel at just the right speed to lift out the lightweight particles, yet permit the heavier gravel to sink to the bottom of the tank.

Here, a dewatering bucket elevator lifts the beneficiated gravel up to the stockpiling belts. Lightweight materials, now removed, pass over a dewatering screen; this deleterious material then drops to a container on the ground beneath the classifier. Occasionally a front-end loader picks up the bucket and wastes this material. Stainless steel is used for the dewatering screen's slotted surface to give long life; the original screening material is still in use after more than 15 months operation.

Water, a low-cost material, does the classifying. Several thousand gallons of water circulate through the unit each minute, pushed by four 12-in. propellers. Driven by 7½-hp. electric motors, the props run in 12-in. tubes which direct water to the classifying chamber.

With proper dewatering of both sound and deleterious products and recirculating the water, the maker states that only about 50 gpm. of make-up water need be added. But Ohio River Sand makes the classifier do double duty by adding perhaps 300 gpm. of clean water. Incoming gravel isn't perfectly clean. To do a cleaning as well as a classifying job, more water is wasted than actually necessary, to carry off some of the fine material which tends to build up the specific gravity of water, making it a "heavy media" and tending to remove the lighter gravels.

Adjustments can be made to compensate for varying rates of flow of gravel, down through the rising current of water. One permits changing the angle of the plate down which incoming gravel slides as it approaches the rising current. By mak-

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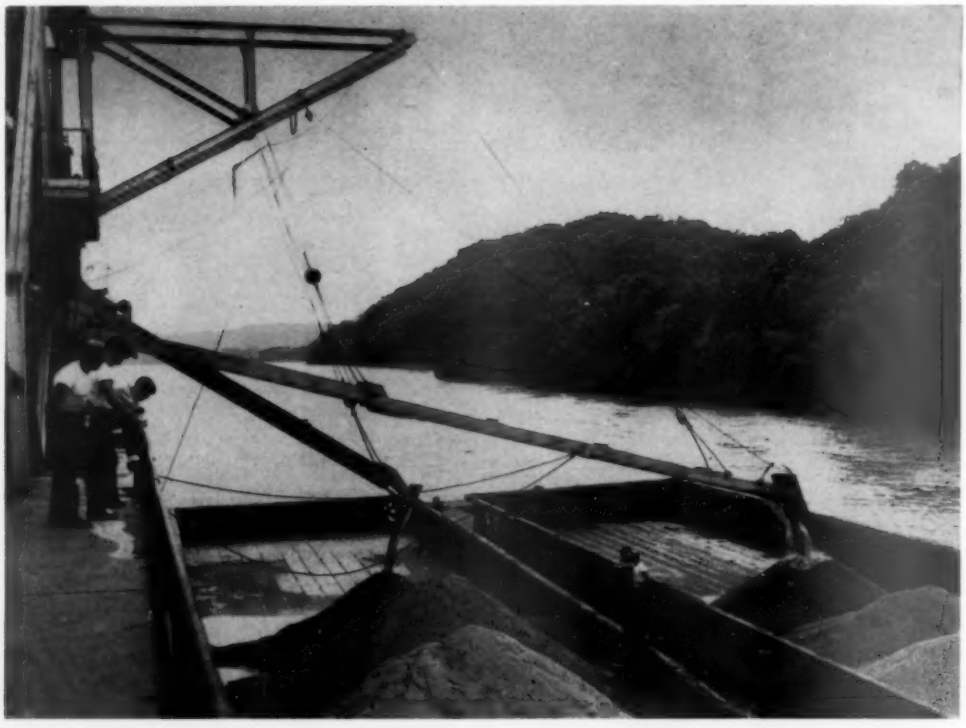
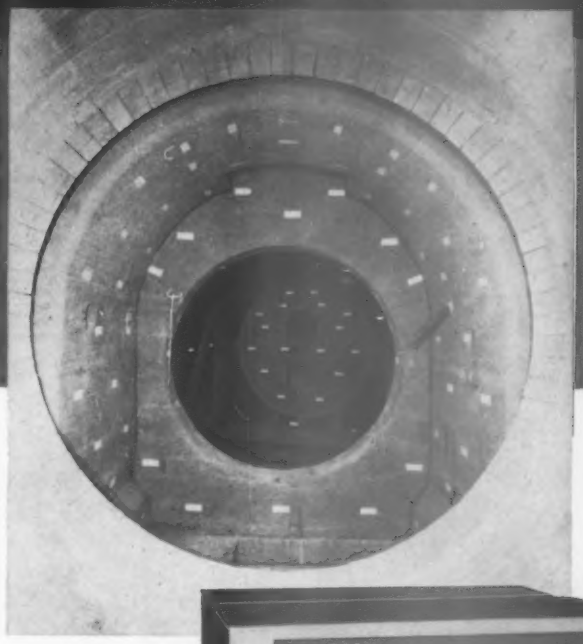


BARGES are moved along beneath spouts discharging sand and pea gravel from dredge "Kentucky." Two grades of gravel are discharged from the other side

A. P. GREEN . . . SUPER HYBOND

JOB-ENGINEERED MONOLITHIC KILN FIRING HOOD



A. P. Green job-engineered monolithic refractory linings readily meet the complex construction requirements and varied service conditions in rotary kiln firing hoods. Furthermore, they offer specific advantages which can be money-savers.

The photograph illustrates A. P. Green SUPER HYBOND as recommended and installed in a typical firing hood. Notice the joint-free surfaces and positive anchorage throughout the lining. These features provide maximum protection against premature failure resulting from dust penetration, bulging, and buckling. Complicated, expensive masonry has been eliminated, as have resulting structural weaknesses.

SUPER HYBOND is a natural choice for such installations. It is a super duty plastic that develops high strength throughout the entire thickness of the lining—increasing the holding power of the anchors. Its high refractoriness readily withstands excessive temperatures, such as might occur in the seal ring or crown areas. Spalling and abrasion resistance are excellent.

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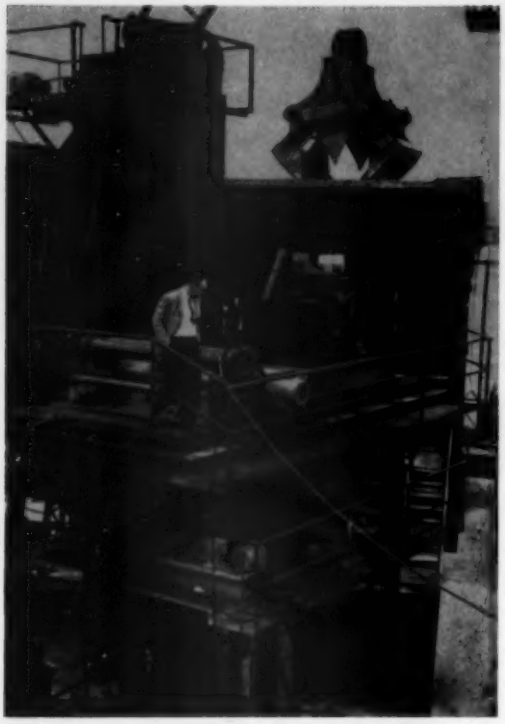
NEW CLASSIFIER CUTS LABOR, SHIPPING COSTS, *continued from p. 128*



FOUR ELECTRIC MOTORS drive the water-circulating propellers mounted inside the unit. The 5-cu. yd. clamshell bucket dumps into feed bin

ing the angle steeper, the orifice through which the rising current passes is widened, reducing the current's speed. This is a simple and effective way of lowering the highest density of waste particle which the rising current can carry with it. Holes in this movable plate let some water through, beginning the separation of heavy and light particles before they get to the orifice.

Two other adjustments permit (1) varying the rate of circulation of water through the unit, and (2) evening the velocity of water over the entire long, narrow orifices.

Ohio River Sand has an efficient operation in its dredge and Louisville yard, though much of the equipment wasn't built recently. The 81-yr. old firm long has been Louisville's largest aggregate producer.

In response to instructions, the big 140-ft. dredge, "Kentucky," moves out into the wide river. When at the desired spot over known deposits of sand and gravel, the "Kentucky" drops heavy anchors and lowers its four spuds—big steel "legs" which firmly support the unit during dredging. Next, a long digging ladder with a continuous chain of cast manganese-steel buckets drops to the river bottom, and dredging begins. Maneuvering on its anchors and spuds, the dredge works back and forth across the river, missing little good aggregate down to the maximum working depth of 65 feet.

Cobbles are scalped off as a first processing step to ease the crushing load. Throughs at this first scalper drop to the first of a series of rising tanks. Carried by bucket elevators and belts, aggregate is screened and rinsed several times, with a gyratory crusher for filling in sizes where the river-bottom deposit is short. Four barges, two on each side of the big dredge, can be loaded simultaneously. Thus up to four products can be made right on the river, usually consisting of three grades of gravel and one of sand or two gravels and two sands.

Once a day the towboat, "J. H. Duffy," moves downstream to the plant with an average of six of the 600-ton barges. By the time the slow-moving tow reaches the yard, the aggregates are largely dewatered by means of perforated wickets in the cargo boxes on the barges (as well as dewatering buckets in the dredge's operation). Roughly 35 percent of the river deposit is gravel; because requirements for sand are less than the 65 percent provided, excess sand is often wasted back into the river. The rising-current classifier, placed at the Louisville yard, is the only processing unit not mounted on the dredge.

One valuable addition to the firm's equipment complement is industrial radio. It links (1) office, (2) river-side yard, (3) towboat, (4) dredge and (5) superintendent's car, permitting instant compliance with instructions as to changing conditions. Previously, the firm used a commercial radio-telephone arrangement and got reasonably good service. The commercial service often was busiest (and, so, useless) just when it was most important to give instructions to the towboat or dredge. There's no waiting to get a line today.

The transmitter-receiver units are housed in compact, attractive grey cabinets of desk height. They harmonize well with office furniture and are unobtrusive. The firm is highly pleased with this recent acquisition. The classifier is made by Fuel Process Co., "D" at 10th Ave., South Charleston, W. Va. The radio is a product of General Electric Company. END

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Traylor-made gyratory crushers

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TY Reduction Crushers are built in 6 sizes from 1'—3" to 5'—6" and with feed openings from 3" to 22". For more information, write for Bulletin No. 8112.

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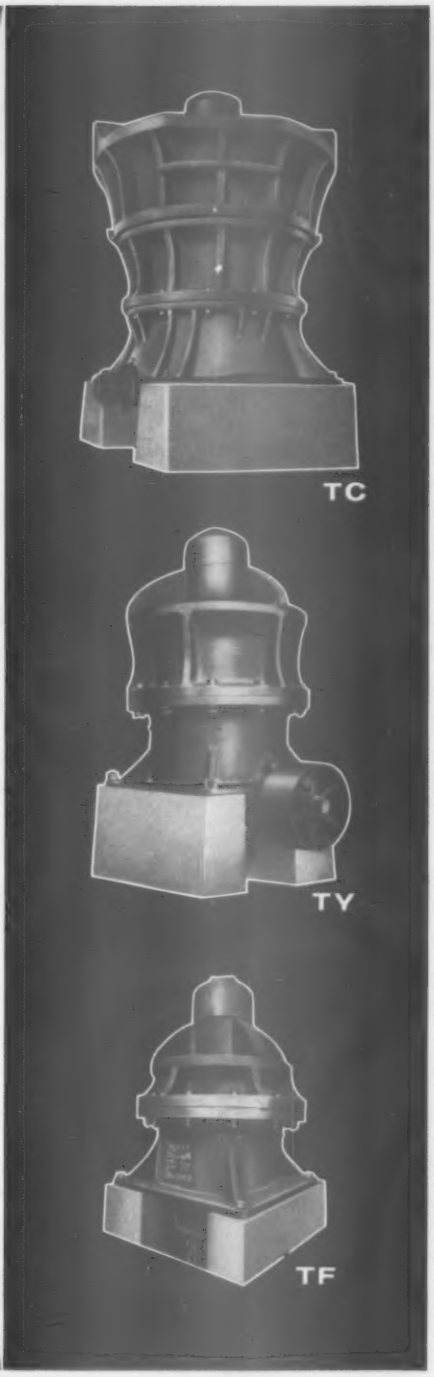

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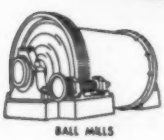
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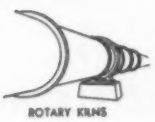
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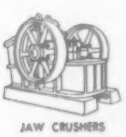
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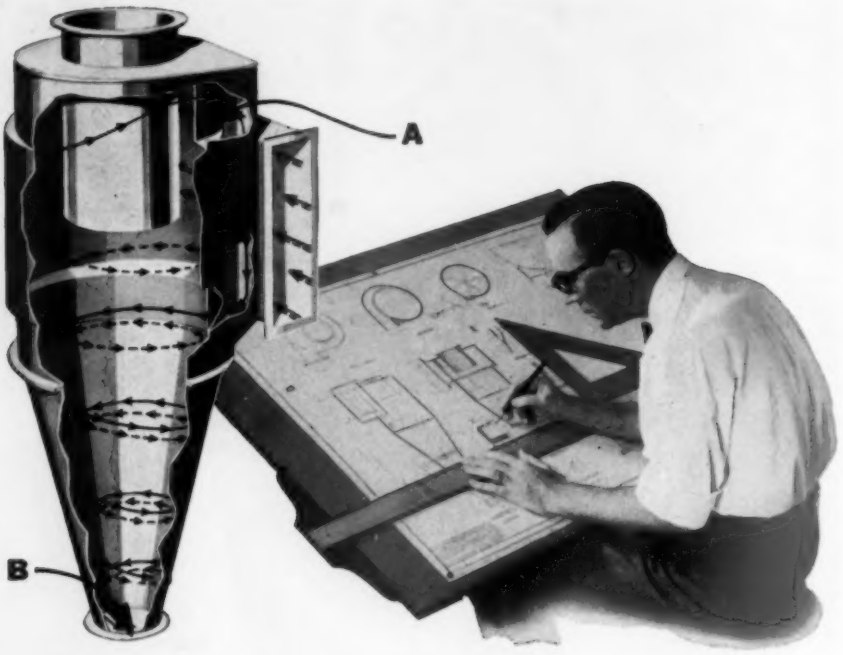

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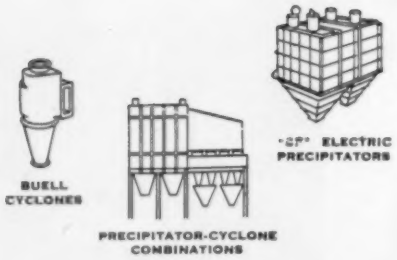

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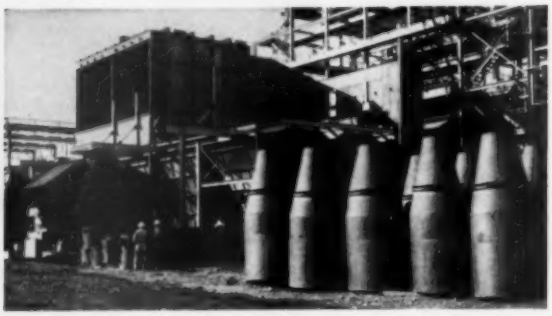

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The financial adviser of your company became the "man of the hour" at the recent Controllers Conference of the National Sand & Gravel Association and the National Ready Mixed Concrete Association

Rising costs push controllers into spotlight

THE CONTROLLER OF YOUR COMPANY—the man who helps you plan your expenditures, then checks on how you stick to plan—is getting to be more of a VIP in your organization than you may realize. In the opinion of one top executive, the controller can advise management better than any other officer. He is being pushed into the spotlight by unparalleled competition and rising costs that can't be reflected in price increases. He will play an increasingly more important role in present and projected future operations.

The financial adviser became the "man of the hour" at the recent Controllers Conference of the National Sand & Gravel Association and National Ready Mixed Concrete Association, sponsored by the Joint Committee on Fiscal Policies. It was held in Toronto, Ont., July 17, and was chairmanned by H. H. Kirwin of the joint committee. The conference was preceded by a day's meeting of the full committee. Results of the Committee deliberations will be reported at a meeting of the Boards of Directors of the Associations late this month.

The problem of cost ratios in both the sand and gravel and ready-mix industries was thoroughly aired. NRMCA has completed a study of costs in that industry. While it was acclaimed as an important contribution, some recommendations for changes in the form were suggested.

Also proposed for next year is a similar study for the sand and gravel industry. Since the opportunities for comparative costs in sand and gravel are much more difficult than in the ready-mix industry, the proposed form of the study got a real going over. But, agreement on recommendations to the NSGA Board was forthcoming after a thorough analysis and report by a subcommittee headed by J. L. Shiely of St. Paul, Minn.

Cost-accounting manuals, formerly made available by the two associations, were reviewed and found to be so complete that revision at this time is not warranted. In the future, the manuals will be made available with the addition of the cost-ratio studies and additional supplementary material, if the Boards agree.

Manuals covering depreciation rates and practices in both industries similarly were found to be complete and modern in their present form. The only major change has been in salvage value. Future copies should be made available with the association bulletin that brings the salvage value question up-to-date and other pertinent information the committee feels should be included.

Conferees were brought completely up-to-date as to current and possible future legislation on depreciation and percentage depletion, as well as the action of courts on pertinent cases. John T. Sapienza, associations' counsel, reported that the depreciation question can be described as snafu. Problems are just now ready to go to the

Please turn page

RISING COSTS PUSH CONTROLLERS INTO SPOTLIGHT, *continued from p. 133*

Supreme Court. The two major problems are (1) depreciable lives and (2) salvage values. As to both of these problems, experts suggest that you procure able assistance by someone who knows taxes, and work out the problems on an individual basis. But be warned: Even though you haven't had a problem, you should keep up on what's happening, because you may have one in the future. Controllers heard the up-to-the-minute analysis of virtually all phases of the percentage depletion problem by Mr. Sapienza.

Royalties and severance taxes were discussed by J. L. Shiely. He explained a royalty as a share of the profit paid to the owner of a property for permitting another to use it. It usually is paid on a unit volume, and amounts vary, depending upon how badly the buyer wants the material. Severance taxes may take the form of a direct tax on the producer, a sales tax on the first sale, or an occupational tax. In common usage, a severance tax is a royalty paid to states for the right to extract minerals. Eight states, as of July 1, have specific severance taxes imposed on the extraction of sand and gravel.

What top management wants in the way of fiscal information was spelled out in an excellent presentation by J. H. Reid, Standard Paving & Materials Co., Toronto. Management is vitally concerned with the forecast and budget, and the controller is most important in this program. Both must represent a preplanned job based on best effort in projection. They give management a program for the future, and the controller must see that the plan is adhered to by comparing actual with projected budget.

On preparation of reports, speed and thoroughness are important. Top management will settle for approximates and estimates when they will give the information desired, and at less cost. Sales are still the prime objective of business, and public relations and customer relations need constant and proper attention. "Don't hamper this by overstrict credit and correction rules," Mr. Reid urges.

Jack R. Fritsch of Louisville, Ky., presented the program his company, Consumers Supply Co., follows on collection policies. He suggests that maximum information be secured on the sale before it is made, then allow cash discounts, follow accounts in 60 days, and make use of lien laws when necessary.

If you've been paying insurance premiums for years without a claim, and feel that you should cancel your insurance on your property, remember that a holocaust may hit you at any time. Take the attitude, "How lucky can you be," counsels Eric C. Ryberg of Salt Lake City, Utah. He thinks that no one can afford to be in the sand and gravel business with less than a half-million dollars in public liability insurance and $100,000 in property damage. "We've used insurance claims for public relations use—to put in a shrub or a sidewalk for a complainant—and that has caused the premium rates to rise. Pay more attention to your policies and what you claim for," he suggests. A good safety program is vital to your insurance position.

Also discussed were product insurance, accounts-receivable insurance and business-interruption insurance. Some of the rates for these types are comparatively low, but they offer protection when you may need it. Mr. Ryberg advises controllers to look into costs of these various insurance types, and talk to their principals about them.

The meeting was climaxed by an excellent discussion on severance taxes, percentage depletion and Wage and Hour Law amendments by V. P. Ahearn, executive secretary of the associations. He indicated that there is no doubt that Congress is moving to the Treasury Department feeling that percentage depletion is a taxing method that gives some industries unfair advantage. The bill sent to Congress this year by the Treasury, however, overshot the objective. It took an attitude against percentage depletion for any industry. This overshooting was enough to give the Congressional Committee a feeling that the bill was not good, and it is dead for this session. He cautioned, however, that the attack on percentage depletion has just begun.

The Wage and Hour Law now is geared to the nature of the work of the employe. If he's in production or handling materials that physically move across state lines, the federal government controls. The Kennedy amendment would wipe out the differences between interstate and intrastate commerce. The present bill applies to the individual, but the new bill would apply to all employes.

This was the first meeting of the joint committee and controllers in five years. It was suggested for the future that meetings should be held biennially, since the cost situation is changing more radically now. END

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WHO'S IN CHARGE? *continued from p. 114*

job is to get production, yours is to maintain my equipment."

The two functions of production and maintenance cannot be separated that easily. Avoidable abuse of equipment not only adds to the required maintenance repair labor, but also adds to operating losses through excessive and inopportune equipment downtime. Whenever operating supervision fails to recognize the full significance of such proper operation and care of equipment, the maintenance chief must draw attention to its importance. One successful maintenance chief, when hearing of or observing an example of equipment abuse, would actually demand that the responsible production supervisor either take immediate corrective action with his employes or go on record that as of that moment he was assuming all responsibility for the continuous operation of that equipment item or machine.

Such a positive manner and demanding approach to this problem by the supervisor of maintenance may seem extreme or even unreasonable. Nevertheless, it worked. Equipment abuse at that plant dropped to an occasional exception; fewer and fewer cases of equipment failure occurred; extending each phase of the preventive maintenance program seemed easier; previous antagonisms toward the maintenance chief's approach gradually disappeared; continuity and volume of production steadily improved. Few cost records ever reveal the extent in improved equipment and employe productivity to which such a positive attitude contributes. Nevertheless, the potential contribution to lower costs is there if supervisors, both operating and maintenance, are willing to take the

Please turn to page 138

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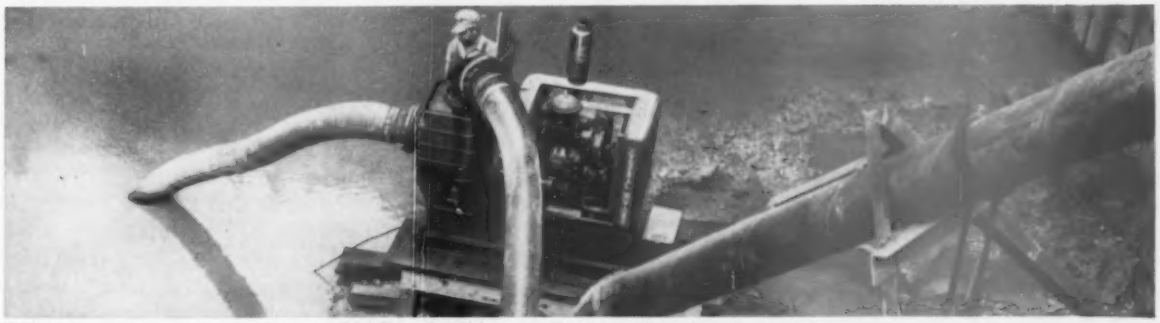

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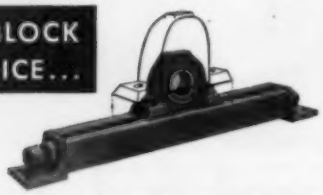

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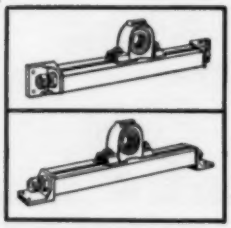
Mount Side or Top

- Use with any standard pillow block. One basic frame size for all makes and types—ball, roller or babbited.
- Mounts either side or top. Simply loosen locknut and turn mounting flange to desired position.
- Easily installed on old or new equipment.
- Delivery from stock in sizes for ¾" to 2⅞" pillow blocks, travel lengths from 2" to 36".
- Mounting screw is totally enclosed for protection against dirt, contamination, etc., yet readily accessible when lubrication or cleaning is desired.
- All parts can be quickly disassembled without special tools and *are individually replaceable.*



Request Bulletin V-647 and Prices.

LOVEJOY FLEXIBLE COUPLING CO.
4822 W. LAKE STREET CHICAGO 44, ILLINOIS

Enter 1204 on Reader Card

WHO'S IN CHARGE? *continued from p. 136*

positive stand necessary to make every phase of their maintenance program work.

The success or effectiveness of maintenance goes as the maintenance chief goes. There must be control; there must be methods and clerical procedure. All of these modern means are essential. But the real key to maximum implementation of maintenance's full role is the man directing its activities. His once simple role, which could be adequately handled by any reasonably good mechanic using a few or even no clerical records, has now become most complex and of ever-increasing importance to every industrial organization's success.

It takes a real man to direct a maintenance program—it takes a real manager of men. It requires a man deserving of and willing to seek every aid from an informed management. His job is not easy, and the obstacles to his success are many. But with the management's active support, the right leader can prove maintenance's real value to lower costs—greater profits. Whom do you have in charge of maintenance?

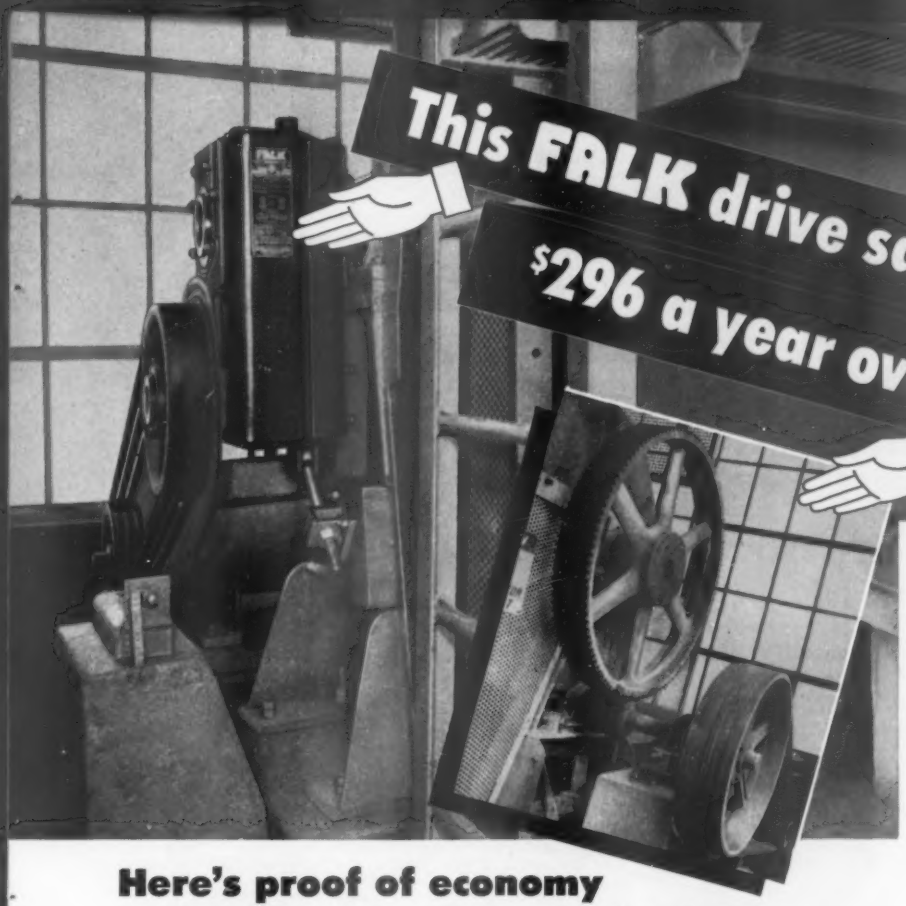
ROCKY'S NOTES, *continued from p. 16*

The court's decision further states: "Two basic questions are raised upon this appeal. The first is whether the department had the statutory power to reserve sand and gravel when selling state lands for agricultural purposes. If the department is found to have such power, a further question is presented, namely, whether the wording of the reservation clause in the deed as issued by the department was in fact sufficient to reserve sand and gravel. The court below found in favor of plaintiffs and decree was entered accordingly."

We will not go into the reasoning of the supreme court as to the validity of the laws governing the duties and powers of the State Conservation Commission, as these are of special interest only to producers in the State of Michigan. Of general interest is the closing paragraph as follows: "The word 'mineral' has a wealth of meanings. If we divide all earthly matter into animal, mineral, and vegetable kingdoms, the place of sand and gravel is obvious. Equally obvious it is that these substances are not mineral in the same sense as gold-bearing quartz. In the instrument before us, the word is used in a limited context. The scope of the mineral reservation is expressly made dependent upon a particular statute, which, as we have seen, classifies sand and gravel as nonmetallic minerals.

Please turn to page 141

Enter 1205 on Reader Card



Here's proof of economy with FALK Shaft Mounted Drives

PROBLEM—For many years, a prominent Eastern abrasives manufacturer* experienced high maintenance and down-time costs, as well as excessive noise and vibration, in the operation of 19 pebble mills driven by open spur gears. Drive gears and jack shaft pillow blocks required frequent repairs or replacement, and trunnion shafts often failed, due to radial overloading of the bull gear when broken pinion teeth bottomed between gear teeth.

SOLUTION—After numerous unsuccessful approaches to these problems, the solution was found by mounting a Size 315J FALK Shaft Mounted Drive directly on the mill drive trunnion. This eliminated objectionable gear noise and vibration...greatly reduced costly down-time and loss of production...and cut annual maintenance and replacement expenses as indicated by the following figures taken from the customer's records:

Spur Gear-and-Pinion Drive		FALK Shaft Mounted Drive	
Bull Gears	$ 56	VEE Belts	$ 30
Pinions	120	FALK Shaft Mounted Drive (based on 10-year life)	70
Pillow Blocks	90		
VEE Belts	30		
Trunnion (5-year life)	100		
Annual cost	$396	Annual cost	$100
		ANNUAL SAVINGS	$296

IF OBSOLETE DRIVES ARE COSTING YOU MONEY, a change to Falk All-Steel Shaft Mounted Drives can effect important savings in money and production. Used on almost any type of machine, these compact, rugged units are establishing new standards of economy and efficiency in many industries. Specify FALK Drives on your purchased equipment...For full details, **write for Bulletin 7100.**

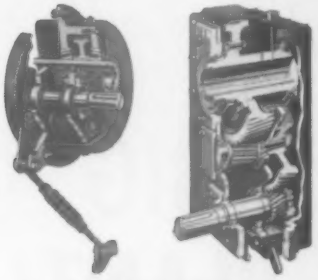
*Name on request

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in Most Principal Cities

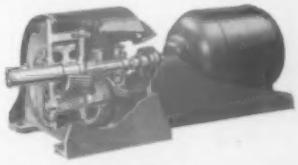
To get the right drive for your application, specify FALK®



SHAFT MOUNTED DRIVES

Horizontal or vertical units—½ to 50 hp—420 to 5 rpm—single and two double reduction ratios—output torque ratings up to 41,000 lb-in (consult factory for higher torque capacity).

• • •



ALL-MOTOR® MOTOREDUCERS

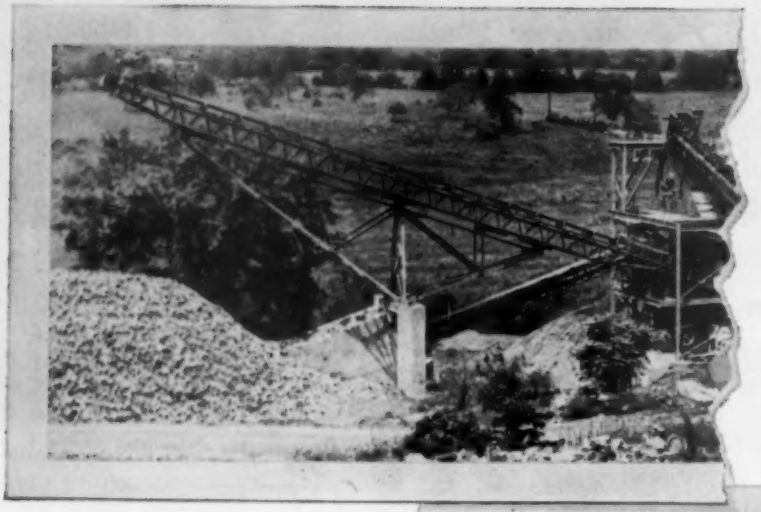
Sizes up to 75 hp—furnished with or without standard foot-mounted motor—standard output speeds 1.2 to 520 rpm (with 1750 rpm motors) —ratios as high as 54,000:1 in semi-standard designs. Integral units (gearmotor type) also available. Ask for **Bulletin 3100.**

• • •

FALK Drives are available from factory and distributor stocks from coast to coast. Consult your Falk Representative or Distributor.

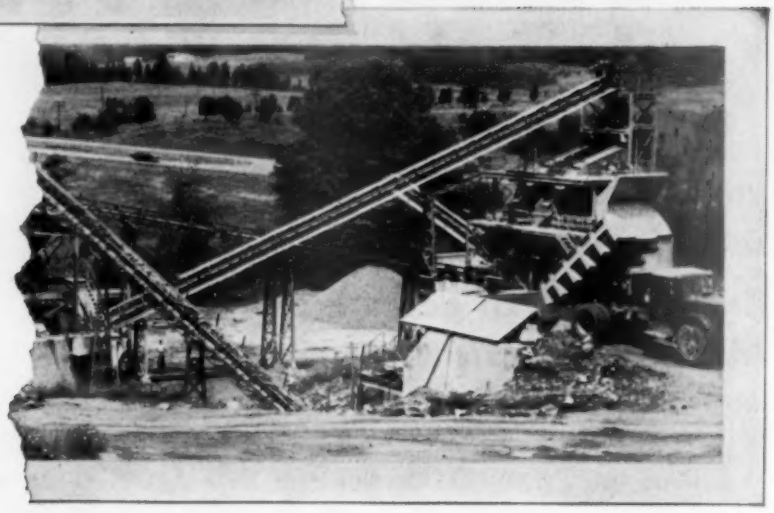
FALK

...a good name in industry



LITTLE SPACE!

BIG PLANT!



Versatile H-R equipment gives high flexibility in 300 x 500 ft. area

PROBLEM: Build a 100 TPH crushed stone plant, on three acres, to include:

Nine standard sectional conveyors
Truck hopper
Apron feeder
Primary crusher
Double deck Vibrex scalper
Secondary crusher
Tertiary crusher
Two triple deck finishing screens
One 1500 ton surge pile
One 1400 ton storage pile
One 800 ton storage pile
Four 40 ton bins

SOLUTION: Specialists of the Hewitt-Robins Rock Products Engineering Staff worked closely with Gainesville Stone Quarry engineers in designing the plant and specifying equipment. Economy and simplicity were primary considerations throughout.

RESULT: H-R sectional conveyors permitted a "custom job" to be put together at "off the shelf" cost and in "off the shelf" time.

If your problem is to pack a big plant into a little space . . . or to build a custom job on a stock budget — it will pay you to take advantage of the H-R Rock Products Engineering services. Consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 9-19.

Long, trouble-free service is assured with H-R roller bearing troughed belt idlers. Idlers are completely lubricated from one side. Triple grease seals at all bearings keep grease in, dirt out.

HR HEWITT-ROBINS

THE NAME THAT MEANS EVERYTHING IN BULK MATERIALS HANDLING SYSTEMS...
DESIGN, MANUFACTURE, INSTALLATION, AND SERVICE OF ALL COMPONENTS

Enter 1295 on Reader Card

ROCKY'S NOTES, *continued from p. 138*

The legislature made specific that which in general speech is obscure. When construed in light of the statute, the deed necessarily reserves sand and gravel to the state. Indeed, this is the very construction the parties themselves gave to the reservation. They were laboring under no mistake during the negotiation of the deed, for nothing was left to mistake. The offer plainly stated, 'Mineral rights include sand and gravel.' "

"Reversed and remanded for entry of decree in accordance herewith. No costs, a public question."

INVEST FOR PROFIT, *from p. 78*

per ton of output and capacity, than did larger plants. Companies producing less than 100,000 tpy. in 1958 spent an average of 85 cents per ton of annual output and 50 cents per ton of annual capacity.

As related earlier in the report, many different kinds of figures were used for tons and man-hours in calculating productivity rates in tons per man-hour. Of aggregates producers replying, 55 percent used tons of saleable output, 32 percent used tons of total output, and the rest used tons of total raw materials. On man-hours, 42 percent used those of production workers only, 33 percent used those of production workers and supervisors, while the remaining 25 percent used total of all man-hours, which includes clerical staff, watchmen and others.

There is an absence of standardization in the industry for reporting productivity rates. The average productivity rate reported for companies in the crushed stone industry, on the basis of production man-hours per ton of saleable output, was 6.18 tons per man-hour. The comparable figure for the sand and gravel industry was 12.9 tons per man-hour. Combined, the reported result was 8.3 tons per man-hour.

Additional information showed that 94 percent of the reporting companies engineered their own projects for capital expenditures to increase productivity rate. Only 30 percent used consulting engineers. Seventy-seven percent got some help from manufacturers in engineering these projects, whereas 15 percent used manufacturers little or none at all. Replies showed that those who used this source of help most felt that the assistance was good. Conversely, those who used it least felt that the service needed improvement. Those in the latter category were mostly in the small-plant segment of the industry. **END**

The proper bucket application gives you maximum cable life

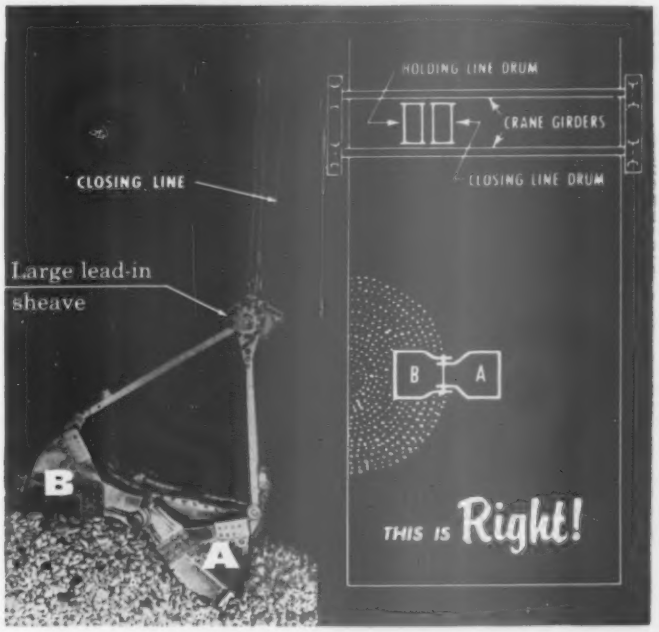
New Blaw-Knox Booklet tells you how

Bulletin 2510 illustrates and describes in pictures and text the proper relationship between:

1. Preferred or required direction of bucket opening.
2. Location and contours of the pile of material.
3. Position of the holding and closing drums in the crane trolley.

Users report amazing increases in cable life as well as improved bucket performance as a result of applying these practical suggestions. A copy of Bulletin 2510 is yours without obligation. Write for a copy today.

BLAW-KNOX COMPANY
Blaw-Knox Equipment Division
Pittsburgh 38, Pennsylvania



BLAW-KNOX

Enter 1202 on Reader Card

NEW LITERATURE

Hoist safety switch

W. C. DILLON & CO., INC., has released Bulletin 17E on its new Dyna-Switch, which prevents dangerous crane or hoist overloads through an automatic cut-off. Another benefit of the unit: costly wear on hoist gear trains is eliminated.

Enter 600 on Reader Card

Crawler tractor

SCHIELD BANTAM CO. has published a bulletin on its new crawler tractor. Standard and optional features found on the tractor's upper unit, including its heavy-duty drum shaft and swing assembly, turntable design, three types of boom hoists and multiple-speed transmission are cited.

Enter 601 on Reader Card

Spherical roller bearings

LINK-BELT CO. announces that Book 2650 is available, which describes its new line of self-aligning spherical roller bearings. Three features of the new bearings are said to make them the highest capacity bearings of this type yet produced. They are: 1. maximum diameter and quantity of convex rollers for each bearing size; 2. precision-machined and centrifugally cast bronze retainers and 3. high, heavy inner race shoulders.

Enter 602 on Reader Card

Gas regulators

AIR REDUCTION CO. is distributing Catalog 806 on its line of cylinder, manifold and station regulators. Typical applications include gas lines on welding and cutting rigs and in laboratories to control gas flow.

Enter 603 on Reader Card

Diesel engines

THE ENGINE DIVISION, CATERPILLAR TRACTOR CO. has released Booklet 20169, "Caterpillar Engines." The complete line of company engines for pit and quarry use is described in this 8-pager. The booklet also summarizes the specifications of all current models and includes photos.

Enter 604 on Reader Card

Spray nozzles

THE INDUSTRIAL NOZZLE DIV. of Wm. Steinen Mfg. Co. has issued 32-page Catalog 59 covering its complete line of industrial spray nozzles. Sizes, capacities and dimensions are given, and a section on applications is designed to help in selecting nozzles for many uses. *Enter 605 on Reader Card*

Right-angle gearmotors

THE LOUIS ALLIS CO. recently published Bulletin 3050 on its line of right-angle gearmotors. Motor and worm gear reducer are combined in the units to eliminate alignment and maintenance problems and save space over other types of reducers. The gearmotors have ratings of ⅓ to 30 hp., single reduction, with output speeds of 23 to 280 rpm.

Enter 606 on Reader Card

Electric generators

D. W. ONAN & SONS, INC., is distributing Folder F-141, describing its complete line of separate electric generators. Available in ac. models from 1,500 to 10,000 w. as well as battery-charging and tractor-drive models, the heavy-duty units are designed for field use with draglines and shovels.

Enter 607 on Reader Card

Torque converters

LINK-BELT SPEEDER CORP. has issued a 16-page booklet describing "How To Get the Most Out of Shovel-Cranes with Torque Converters." Since the converter is relatively new, the booklet is designed to give tips on how to boost production with less effort with rigs equipped with torque converters. *Enter 608 on Reader Card*

Apron conveyors

CHAIN BELT CO. recently released Bulletin 58100 on its leak-proof aprons. Specifications of the four models of Style A aprons are given for the units, designed for handling large quantities of bulk materials where impact problems, size of lumps and extra-heavy material loads are governing factors.

Enter 609 on Reader Card

Oven

THE STANDARD SCIENTIFIC SUPPLY CORP. has issued a 1-page description of the oven that maintains uniform temperatures throughout the working chamber. It uses either 115 or 230 volts. Power selector switch permits high or low input to the enclosed, explosion-proof heating elements. Four heaters are fastened to the outside of the aluminum chamber, giving uniform heat distribution.

Enter 610 on Reader Card

Tractor shovel movie

TRACTOMOTIVE CORP. is distributing a 19-min. color and sound movie depicting the uses of its TractoLoaders. Highlighted are the units' hydraulic systems, which have full-flow micronic filter plus screen and magnetic filters. TractoLoaders are distributed through Allis-Chalmers Construction Machinery Div. dealers. *Enter 611 on Reader Card*

Bits

OIL TOOL MFG. CO., INC. has issued a catalog listing its entire line of bits, and giving available sizes and specifications of all designs. Included is recommended use of each and general plant information.

Enter 612 on Reader Card

(Continued on page 144)

new model H-50 PAYLOADER®

5000 lb. carry capacity... 3/4 to 2 yd. buckets

The model H-50 is the successor to the model HU in the "PAYLOADER" line of 4-wheel-drive tractor-shovels, and is another example of the continual development program that has maintained Hough leadership in tractor-shovel design and performance. It contains a number of improvements that give it outstanding performance for a machine in this size range.

BALANCED DESIGN Hough "balanced-design" provides correct weight distribution plus a proper balance between power, drive train components and hydraulic system consistent with the handling of maximum tonnages.

MORE POWER The H-50 gives you a choice of gasoline or diesel engines, and more horsepower in both types — 92 hp gasoline, 90 hp diesel. These bigger engines provide more power for both propulsion and hydraulics without "lugging down".

EASY, FULL-POWER OPERATION Power-shift transmission with three speeds forward and reverse, plus easy power-steer and 4-wheel power brakes assure fast operation with minimum operator effort... promote a high production rate the full shift.

PROTECTED FOR LONG LIFE Sealed front brakes, complete filter protection for engine and hydraulic systems, hypoid differential with power-transfer feature, and planetary final drives are some of the many design details that will assure low maintenance, reliable service and long life.

MORE ATTACHMENTS... MORE USES The widest choice of attachments are available, including these exclusive ones: Drott 4-in-1 bucket, Wain-Roy Backhoe, Vibratory compactor, Ram Black-top spreader ... also blower, "V" and blade plows, angling backfiller, back-rip scarifier, winch and others.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
705 Sunnyside Ave., Libertyville, Ill.

☐ Send data on H-50 "PAYLOADER".
☐ Other "PAYLOADER" units to 12,000-lb. carry cap.

Name _____
Title _____
Company _____
Street _____
City _____ State _____

9-8-3

Enter 1296 on Reader Card

NEW LITERATURE

(Continued from page 142)

Bin vibrator

SYNTRON CO. has released a catalog on their "Pulsating-Magnet" electric vibrators for keeping stubborn bulk materials and bulk parts free flowing from bins, hoppers and chutes. Amply illustrated, the 12 pages give complete descriptions, data and specifications for 14 standard vibrators, ranging from the diminutive 2 lb. model to the 950 lb. model. There are also six impact-type vibrators, four semi-noiseless and four noiseless models. The catalog also presents illustrations and information concerning separate vibrator controllers.

Enter 613 on Reader Card

Diamond core drill

BUCYRUS-ERIE CO., Drill Div., has published a 6-page booklet on their diamond drill that specializes in exploration coring for mines and quarries, reinforced concrete coring and boring for installation of gas, telephone, electrical and water services, drilling pavement for testing cores and general contracting drilling. Weighing 45 lb., the machine is portable. It can be set up in five minutes. The power plant is a 5½-hp., 2-cycle, air-cooled gasoline engine. The starter is the nylon cord recoil type.

Enter 614 on Reader Card

V-belt drives

DODGE MFG. CORP. is distributing 44-page Bulletin A-695, describing its new line of smaller, lighter, less expensive V-belt drives. Construction features of Dyna-V sheaves and V-belts are said to enable them to deliver up to three times the horsepower of conventional units in a given space. Specifications are included which give sizes and capacities. ***Enter 615 on Reader Card***

Control systems

INDUSTRIAL NUCLEONICS CORP. has published an 8-page illustrated brochure describing its new tank and bin level-control systems. These systems provide a signal which can be used as an alarm or as a control signal when the level of liquid or solid material in a vessel rises above or falls below a chosen point. In addition, they can be used to provide a signal for automatic control of the material within a pre-set band. With liquid materials in a tank, accuracies up to ⅛ in. of the target level are obtained.

Enter 616 on Reader Card

Plastic-coated gloves

AMERICAN OPTICAL CO., Safety Products Div., has published a bulletin on their line of coated gloves. The new series features non-slip wet and dry grip. Recommended for operations where a sure grip is needed, the "Plastifab" gloves are coated with a blend of plastic resins and plasticizers to provide abrasion resistance. The series comes in 6 models and includes choice of full or partial coatings.

Enter 617 on Reader Card

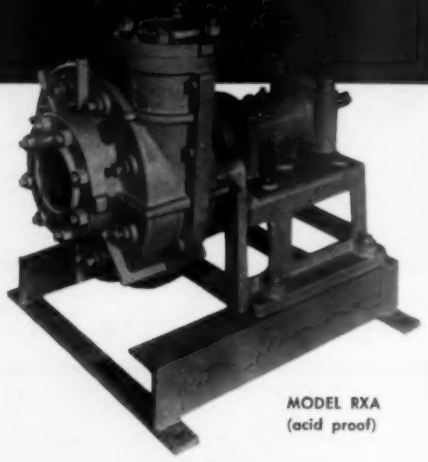
Power transmission machinery

DODGE MFG. CORP. has published a comprehensive review of the company's line of power transmission machinery. The bulletin features the Flexidyne dry fluid drives and Paraflex flexible cushion couplings. It offers illustrated descriptions of such products as steel conveyor pulleys, roller chain drives, various types of shaft couplings and a new line of V-belt drives. ***Enter 618 on Reader Card***

(Continued on page 146)

NEW!

PERFORMANCE-PROVED CERAMIC-LINED SAND PUMP



MODEL RXA
(acid proof)

ARE YOU USING pumps for transferring fines? Is the volume in the range of 110′ head-150 GPM to 70′ head-600 GPM?

ARE YOU TIRED of replacing impellers, liners, shells, sleeves, seals, bearings, shafts, bolts, nuts, gaskets, etc., every few months?

ARE YOU WISHING someone would produce a pump worthy of your expectations? Something that would hold up for say — 14 months? 18 months? 2 years!

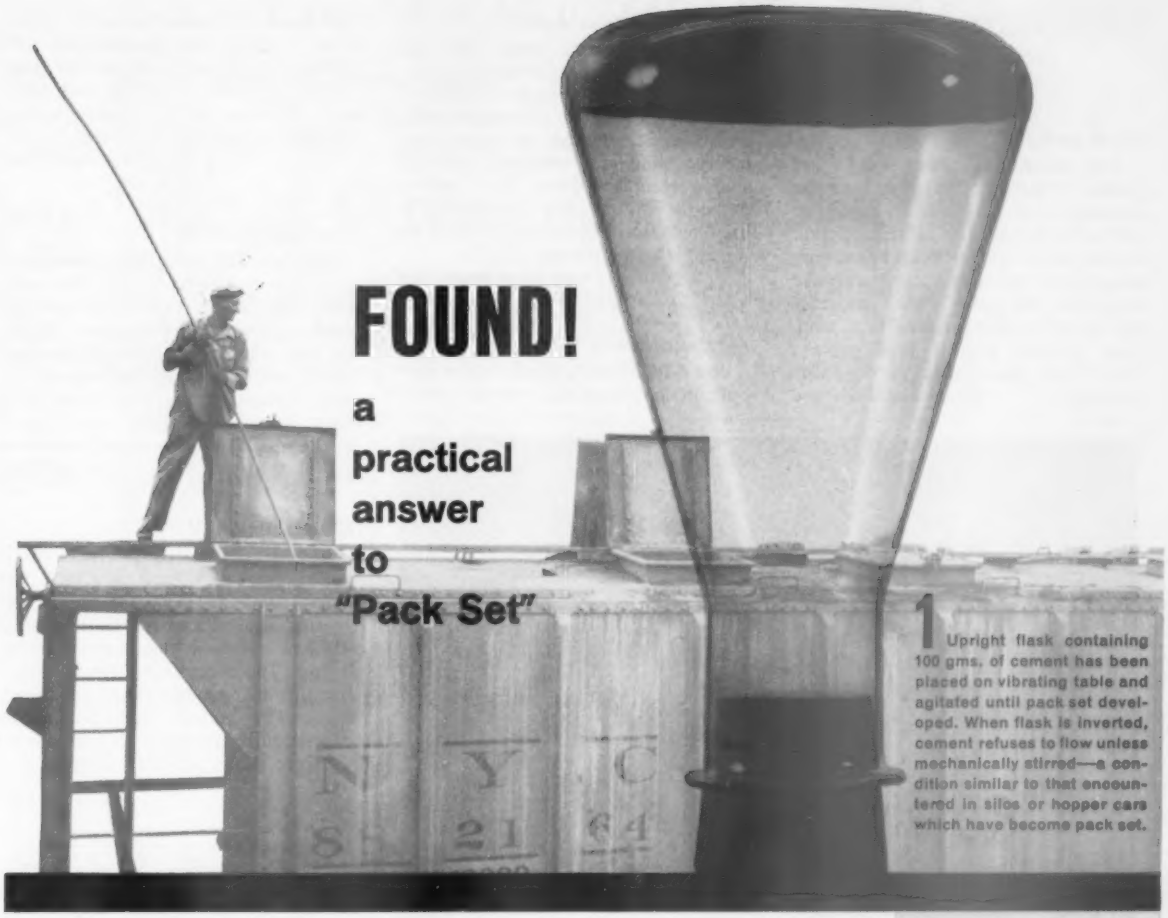
YOU WILL FIND the ultimate in wear resistance in ceramic lined pumps using silicon nitride bonded silicon carbide wear parts.

SOUND EXPENSIVE? Not at all. Cost is comparable to alloyed iron or rubber lined pumps.

For additional information on the new MODEL RXA Ceramic-Lined Sand Pump, write:

The KANSAS CITY HAY PRESS COMPANY
801 Woodswether Road Kansas City 6, Missouri

Enter 1244 on Reader Card



FOUND!

a practical answer to "Pack Set"

1 Upright flask containing 100 gms. of cement has been placed on vibrating table and agitated until pack set developed. When flask is inverted, cement refuses to flow unless mechanically stirred—a condition similar to that encountered in silos or hopper cars which have become pack set.

Dry dispersion with TDA

If you're paying good money to move "pack set" cement—or if your customer is—this message is meant for you.

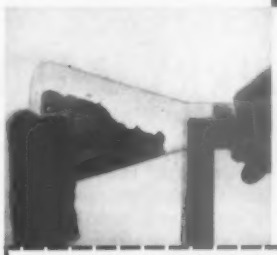
Pack set can be overcome *in the grinding operation.* The answer is Dewey and Almy's TDA, a dry dispersant.

Accepted by ASTM as non-harmful to cement, this product has been in use as a grinding aid for nearly a quarter century. Its effectiveness as a *pack set inhibitor* has been clearly established by the test method illustrated in these laboratory photographs.

Get the facts about TDA and dry dispersion. Check the coupon now and evaluate TDA in your own operations.

W. R. GRACE & CO.
DEWEY AND ALMY CHEMICAL DIVISION
Cambridge 40, Mass.

2 Now flask is placed on horizontal axis and gently rotated in half-turns until cement is loosened and flows once more. Number of half-turns is termed "Pack Set Index".



3 Laboratory demonstrations, substantiated by field experience, show that cement interground with TDA has a Pack Set Index one-third to one-fourth that of untreated cement . . . *flows three to four times more readily.*

Dewey and Almy Chemical Division, W. R. Grace & Co.
621 Whittemore Avenue, Cambridge 40, Massachusetts
Attention: Rock Products Chemicals Department

☐ Please forward the new TDA "Pack Set" Bulletin ☐ Please arrange a full-scale test grind in our plant

NAME.....
TITLE.....
COMPANY.....
ADDRESS.....
CITY.....ZONE.....STATE.....

Enter 1297 on Reader Card

NEW LITERATURE

(Continued from page 144)

Solids pump

THE MORRIS MACHINE WORKS has published Bulletin 189 describing the capacities and ranges of its new type CK solids pump. The centrifugal unit is designed to handle fluids containing random size solids and highly abrasive materials. The pump is used in dredging operations and for slurries of sand, coal, tailings, gravel, lime process wastes and other abrasive or pulpy mixtures. ***Enter 619 on Reader Card***

Lubricant selector chart

ALPHA-MOLYKOTE CORP. has just released a lubricant selector chart that evaluates every type in the company's lubricant line based on temperature, environment, method of application, incorporation into common materials and recommendations for various parts, operations and conditions. A brief technical description of each lubricant is also included.

Enter 620 on Reader Card

Air compressors

JOY MFG. CO. has released a new bulletin describing the company's WN-224 heavy-duty industrial air compressors. Included are specifications and dimensions for six basic models ranging from 350 to 1,250 hp. and 2,418 to 7,392 cfm. Cross-section drawings and photographs are included.

Enter 621 on Reader Card

Clamshell buckets

CHICAGO BUCKETS, INC., has issued a booklet describing its dual lever-arm clamshell buckets. Features include the dual lever-arms, which give digging on both edges, and four-part reeving, which is quicker than six-part reeving and because of the dual lever arms does more work than some other buckets. ***Enter 622 on Reader Card***

Closed circuit TV

THE ELECTRONICS DIVISION, DIAMOND POWER SPECIALTY CORP. has issued Bulletin 1194 listing the 30 specific applications for closed circuit TV application in the steelmaking industry. The uses range from ore mining through product finishing operations. The bulletin includes capsule case histories of five major heavy industry systems. ***Enter 623 on Reader Card***

Dump trailer performance

GALION ALLSTEEL BODY CO. has issued a job study folder that describes the performance provided by the 20-ft. excavator-type dump trailers and twin-cylinder underbody telescopic hoists. Dump trailer and hydraulic hoist applications covered involve unusually rugged operating situations, including excavation of 800,000 cu. yd. of clay, dirt and broken concrete. Many aspects of the project necessitated long distance hauling. ***Enter 624 on Reader Card***

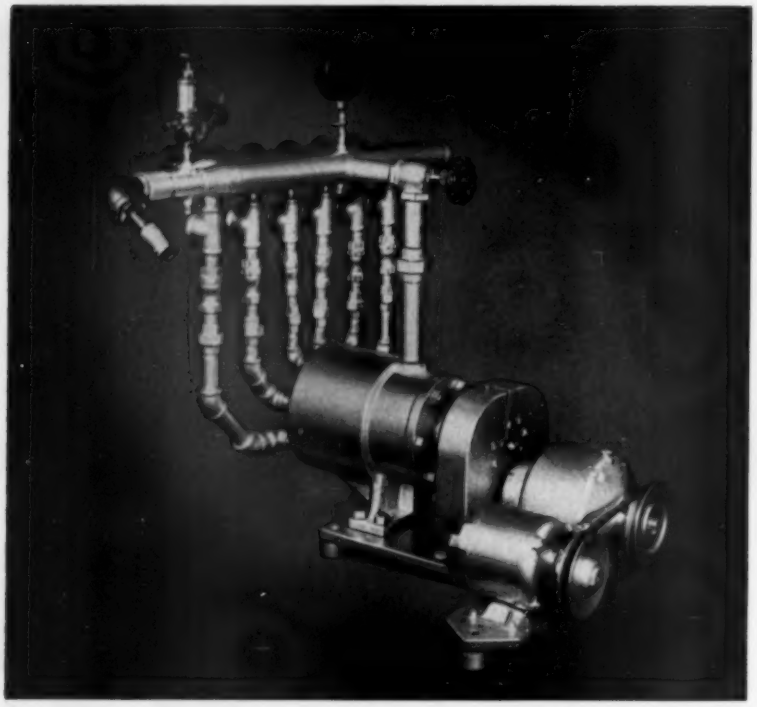
Motor scraper

ALLIS-CHALMERS MFG. CO. has issued a brochure that gives engineering features and operating advantages of its TS-260 motor scraper, powered by a 16000 diesel engine with 230 hp.

Enter 625 on Reader Card

Bulk fertilizer

HIGHWAY EQUIPMENT CO., Dept. A32-4, is distributing a pocket-sized booklet entitled "Your Land Is Different," showing how bulk fertilizer can save farmers time and money. It tells customers of aglime producers how to properly apply fertilizer and test their soil. ***Enter 626 on Reader Card*** **END**



MANITOWOC CENTRAL CONTROL VALVE

FOR SLURRY AGITATORS

The Manitowoc Central Control Valve is a self-contained, fast acting unit complete with air manifold and valve drive. Shown above is a motor-driven central control valve regulating air supply to six slurry agitators. It can be timed with great precision to suit any desired operating cycle and any electrical current characteristic. The entire unit is mounted on a common bed plate with driving mechanism fully enclosed and automatically lubricated.

The Manitowoc Slurry Agitator is designed to use air on an intermittent cycle—as supplied by the Central Control Valve—as economically as possible, and at the same time employs a unique method of piping that prevents the air line from plugging.

Get complete information on the Manitowoc Central Control Valve, Slurry Agitators and Recuperators for rotary kilns—write today!

MANITOWOC SHIPBUILDING, INC.

A subsidiary of The Manitowoc Company, Inc.

MANITOWOC, WISCONSIN

Enter 1245 on Reader Card

BEMIS EXTENSIBLE MULTIWALLS...*THAT'S WHY!*

During the past twelve months,* Bemis has delivered more multiwall bags to the cement industry than in any similar period in its history.

*Period ended June 30, 1959

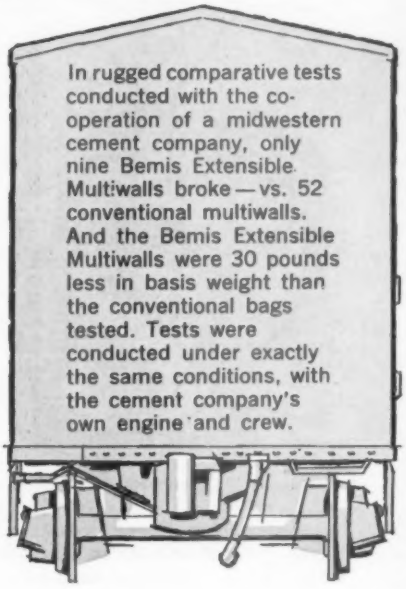
why?...BEMIS EXTENSIBLE MULTIWALLS!

And during this same period, cement plant management and packhouse crews, traffic men and building materials dealers, have noticed reduced bag breakage all along the line.

why?...again, BEMIS EXTENSIBLE MULTIWALLS

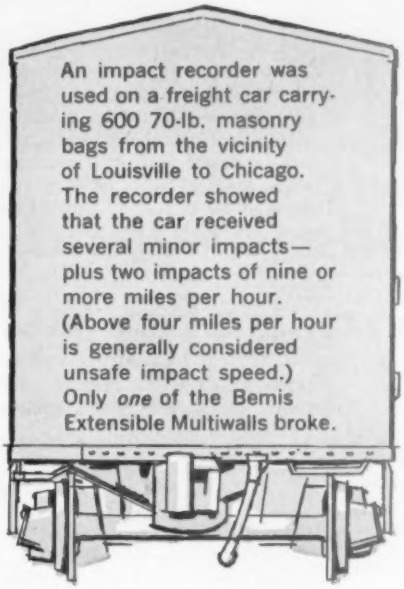
These bags, made of revolutionary "stretch" multiwall kraft paper with traditional Bemis skill, have performed amazingly well.

for example:



In rugged comparative tests conducted with the co-operation of a midwestern cement company, only nine Bemis Extensible Multiwalls broke—vs. 52 conventional multiwalls. And the Bemis Extensible Multiwalls were 30 pounds less in basis weight than the conventional bags tested. Tests were conducted under exactly the same conditions, with the cement company's own engine and crew.

another case:



An impact recorder was used on a freight car carrying 600 70-lb. masonry bags from the vicinity of Louisville to Chicago. The recorder showed that the car received several minor impacts—plus two impacts of nine or more miles per hour. (Above four miles per hour is generally considered unsafe impact speed.) Only *one* of the Bemis Extensible Multiwalls broke.

and in tests . . .

covering actual shipments made over a period of six months with the cooperation of nine eastern cement companies, Extensible Multiwalls outperformed conventional multiwalls by a substantial margin, even though they were from 11.7 per cent to 16.6 per cent less in basis weight.

If you haven't tested these rugged bags in your plant, call your Bemis man today.

why?

BEMIS EXTENSIBLE MULTIWALLS

—your best package for cement and related products

BEMIS

Where flexible packaging ideas are born

GENERAL OFFICES • 408 PINE STREET • ST. LOUIS 2

Enter 1298 on Reader Card

NEW PATENTS

by OLIVER S. NORTH

RECENTLY ISSUED PATENTS ON NONMETALLIC MINERALS*

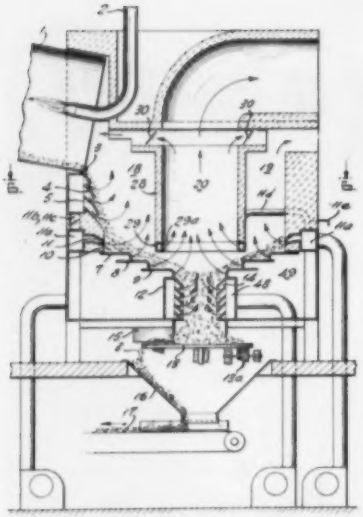


Diagram for Patent No. 2,891,321

Cement

2,891,321—Improved rotary grate apparatus for cooling **portland cement** clinker. (to H. Habel. Assigned to VEB Zementanlagenbau Dessau)

Lime

2,879,827—Use of hydrated **lime** in the production of a phenolic resin base electrical insulation material. (to W. R. Bowditch, Jr.; assigned to Taylor Fibre Co.)

2,880,069—Manufacture of calcium carbide by heat reaction of coke and **lime** in a shaft furnace. (to S. Koopal; assigned to Stamicarbon N. V.)

Mica

2,884,343—A heat-resistant textile comprises a cotton-**asbestos** fabric impregnated with a **mica**-containing flameproofing composition. The mica provides a texture that enables the fabric to be readily folded. (to J. D. McCluer; assigned to Thermoid Co.)

2,885,078—In the froth flotation recovery of **mica** from river silt deposits, the raw silt is screened, and the 4-80 mesh fraction scrubbed, deslimed, conditioned and subjected to flotation. (to D. H. Fenske; assigned to International Minerals & Chemical Corp.)

Feldspar

2,883,050—Design for an improved apparatus for use in the hand-picking of ores. The mechanism is claimed to be especially adapted for cleaning and sorting **feldspar** and similar ores containing quartz and other rock gangue whose physical characteristics resemble those of the contained mineral values. (to E. W. Windolph)

Clays

2,879,229—Use of organophilic **bentonite** as a bodying material in lubricants. (to C. A. Stratton; assigned to Phillips Petroleum Co.)

Gypsum

2,882,175—In the described lightweight plasterboard, a part of the **gypsum** plaster normally used is replaced by a reactive pozzolan. The preferred pozzolan is calcined oil-impregnated **diatomaceous shale,** such as occurs in California. (to F. H. Bailly)

2,884,779—Method of making laminated **gypsum** board having staggered edges with interlocking profiles. (to R. G. Buergin and J. K. Hovind; assigned to National Gypsum Co.)

2,885,154—Fluid energy mill and method for grinding relatively soft minerals such as **gypsum, barite, talc, marl** and **oystershell.** (to D. B. Eastman and F. E. Guptill, Jr., assigned to The Texas Co.)

Asbestos

2,891,734—Improved breaker for **asbestos** rock. The ore is fed to a rotating member which throws it against breaker surfaces, from which incompletely broken rock rebounds to the rotating member for additional projection against the breaker plates. (to E. O. W. F. Andreas. Assigned to Firma Hazemag Hartzerkleinerungs- und Zement-Maschinenbau G.m.b.H.)

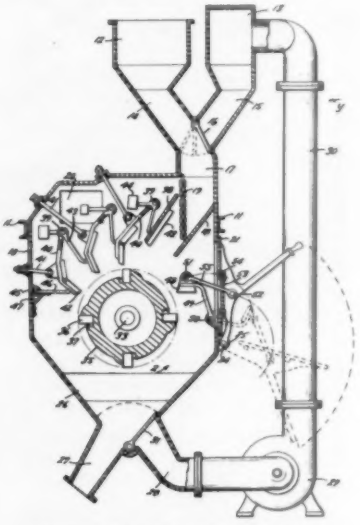


Diagram for Patent No. 2,891,734

Aggregates

2,890,079—Apparatus and method for simultaneously spraying onto a surface a binder agent and a fibrous or granular material, such as expanded **perlite,** exfoliated **vermiculite, mineral wool, asbestos,** etc. (to F. M. Stumpf; assigned to United States Mineral Wool Co.) *(Continued on page 150)*

*Copies of United States patents are available at a cost of 25 cents each (photostat copies of foreign patents at 30 cents per page) from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.

Enter 1242 on Reader Card

Maneuvering into or out of narrow, twisting underground tunnels is easy for LeTourneau-Westinghouse Rear-Dumps. Model D can U-turn in less than 25'. If roof clearance is 14'8" or more, "D" can raise bowl and turn in a tight 18'8" of clearance.

Fast, clean dump by 11-yd D Tournapull Rear-Dump speeds rock to crusher at Fort Hartford Stone Co., near Hartford, Ky. Electric motors, standard on all Tournapull units, raise and lower bowl with speed and safety.

"Only units maneuverable enough to give us good production"

That's how Mr. A. C. Hall, owner of Fort Hartford Stone Co., Hartford, Kentucky, describes the 4 LeTourneau-Westinghouse D Tournapull® Rear-Dumps that move up to 225,000 tons of limestone a year from deep inside the firm's underground mine.

Three of the 11-ton-capacity L-W units are usually assigned to haul excavated rock from shovels working in the tunnels. They complete 6,000′ round trips . . . one third of that distance inside the narrow tunnels . . . in an average of 12 minutes. Of this operation, Hall says: "Large trucks just can't turn in the working area. 'D's' are the only machines that can maneuver in the tight quarters of the working faces without stopping. It cuts lost time."

Double-duty yard workers

Another "D" normally works in the open, stockpiling rock and gravel, and pushing rail-cars. At times, the whole L-W Rear-Dump force teams up with 2 front-end loaders to fill rail-cars in the yard. Rear-Dumps carry the material from crusher to stockpiles near the cars. Tractors then load it aboard. This "teamwork" loads a car in an average of only 12 minutes elapsed time.

Six years of tire use

"D" maintenance is easy. Hall cites tire-life as an example. "Our first Rear-Dump was new when we bought it," he said, "and it was six years before we had to replace a tire.

"Whenever I've decided to buy another hauler, I've considered all makes carefully. And I've always decided on a Tournapull Rear-Dump."

LeTourneau-Westinghouse Rear-Dumps are available in three sizes: the 138-hp, 11-ton "D"; 226-hp, 22-ton "C"; and 335-hp, 35-ton "B". Ask for a demonstration of the model best suited to your work.

DR-2006-MQJ-1

LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

NEW PATENTS

(Continued from page 148)

Vermiculite

Canadian 575,855—Flapper mill and process for use in purifying exfoliated **vermiculite** and suspending the purified material in an oil for use as a lubricant. (to B. H. Rouse; held by Orma G. Rouse, May 12, 1959)

British 813,009—To replace gypsum plaster, a wall is covered first with a mixture of **pumicite,** sand, cement, cellulose glycollate, an alkyl sulfate, and exfoliated **vermiculite.** Subsequently, a finish coat comprising vermiculite, sand, cement, cellulose sulfite, and a fungicide is applied over the scratch coat. Application is by spray gun. This wall has good heat and sound insulating properties and is resistant to molds. (to W. Schneebeli, May 6, 1959)

Spodumene

Canadian 578,130—In the extraction of lithium compounds, **spodumene** is calcined to the gamma form and mixed with anhydrous sodium acetate or the like, and the mixture heated moderately, cooled, ground, and lixiviated with water. The soluble salts are then recovered and treated by known methods. (A. V. Kroll. Assigned to Compagnie Geologique et Miniere des Ingenieurs et Industriels Belges "Geomines". June 23, 1959.)

Clay

British 812,010—Activation of **kaolin** by acid treatment, oil aging, and calcining. A mixture of kaolin and H_2SO_4 is extruded, and the pellets aged in white mineral oil prior to calcination. (to Minerals & Chemicals Corporation of America. April 15, 1959.)

Cement

Canadian 574,280—In a fluidized bed process for economically manufacturing high quality **portland cement,** the calcining and oxide combining reactions are carried out simultaneously in a single reaction zone. Formation of a clinker is avoided. (to R. Pyzel, Apr. 21, 1959)

British 812,147—Method for making a **portland cement** raw slurry which can contain a relatively high proportion of solids at no increase in viscosity, so that it can be more easily pumped. Enough carbon dioxide is added to the slurry to bring its pH to 6 to 7. (assigned to Monolith Portland Midwest Co., Apr. 22, 1959)

Canadian 575,062—In the filling of valve-type bags with **portland cement,** an exhaust device is provided for preventing escape of the pulverulent material to the atmosphere. (to E. S. Whitmire; assigned to Volunteer Portland Cement Co. Apr. 28, 1959)

Canadian 576,703 — Means for mounting tires on a rotary **portland cement** kiln in such a manner that expansion and contraction of the kiln are readily accommodated without undue stresses. (to J. T. Risse. Assigned to Iowa Mfg. Co. of Cedar Rapids. May 26, 1959.)

British 814,749—Method for making a volume-stable **portland cement** from raw materials that are relatively high in magnesium, e.g., dolomites or dolomitic limestones, such as produce clinker having in excess of 6 percent magnesium oxide. A cooled clinker of prescribed petrographic composition is mixed with fly ash or other siliceous material containing an "active" silica component. The resulting finished cement makes a concrete which does not break up as do most high-magnesium concretes. (to J. Rosa. June 10, 1959.)

British 814,836—A **white portland cement** having improved whiteness is obtained by subjecting hot white portland cement clinker at a temperature of over 1,652 deg. F. to a reducing treatment for 30 to 60 min., and thereafter cooling it slowly to below 1,292 deg. F. in an inert or reducing atmosphere, and finally rapidly quenching the treated clinker. (Assigned to Dyckerhoff Portland-Zement Werke A.G. June 10, 1959.)

Aggregates, lightweight

Canadian 576,610 — Compositions and methods for insulating underground and overhead pipe installations. The pipes are jacketed in perforated metal tubes, wire mesh, expanded lath or the like, and the jackets filled with an aqueous mixture of portland cement and exfoliated **vermiculite.** A powdered bitumen, e.g., **gilsonite,** may be added to improve the water resistance properties. Instead of vermiculite, expanded **perlite** or foamed **blast-furnace slag** may be used. (to D. C. Goff. Assigned to Zonolite Co. May 26, 1959)

Canadian 576,783—Apparatus and method for producing **expanded clay** lightweight aggregate, whereby the particles are round and not fused together. A raw clay-sulfite waste liquor mixture is fed to a rotary kiln consisting of two individually rotating compartments, in the first of which the clay is slowly tumbled and preheated to incipient fusion. In the second, the heating is continued and the material tumbled more rapidly. (to A. Frokjaer-Jensen. June 2, 1959)

Canadian 577,444—In the making of an improved granulated ammonium phosphate fertilizer, phosphoric acid is mixed with exfoliated **vermiculite,** and the mixture agitated while gaseous ammonia is passed therethrough. Solid, dry, porous granules of uniform size are produced. (to S. E. Ostergaard. Assigned to Canadian Industries Ltd. June 9, 1959.)

Canadian 577,436—A composition used for coating pipes prior to encasing them in concrete comprises a mixture of grease and, preferably, exfoliated **vermiculite. Pumice** or expanded **perlite** may be used in place of vermiculite. A coating of this type permits moderate expansion of the pipe without damage to the concrete. (to D. C. Goff. Assigned to Zonolite Co. June 9, 1959.)

Phosphate rock

Canadian 577,027—In an improved process for disintegrating uncalcined or crude **phosphate rock** with mineral acid, the digestion mass is passed continuously through a series of connected vessels. Portions of the slurry are continuously withdrawn from the later vessels and recycled to earlier vessels along with additional acid. Fresh rock is constantly fed into the initial vessel in the series. (to F. Brandt, H. Nees and K. Liebrecht. Assigned to Chemische Fabrik Kalk G.m.b.H. June 2, 1959.)

Miscellaneous

Canadian 577,094 — Method for treating **phosphate rock, feldspar, fluorspar, langbeinite, sylvinite,** and other nonmetallic minerals so as to improve the efficiency of subsequent froth flotation. Effects of slimes are minimized and aeration is improved by conditioning an aqueous pulp of 14 to 200 mesh particles with an oxidizing agent, such as Na_2O_2 alone or mixed with H_2O_2 or lithium fluoride. Thereafter, flotation is accomplished in the usual manner. (to I. M. Le Baron. Assigned to International Minerals & Chemical Corp. June 2, 1959.) **END**

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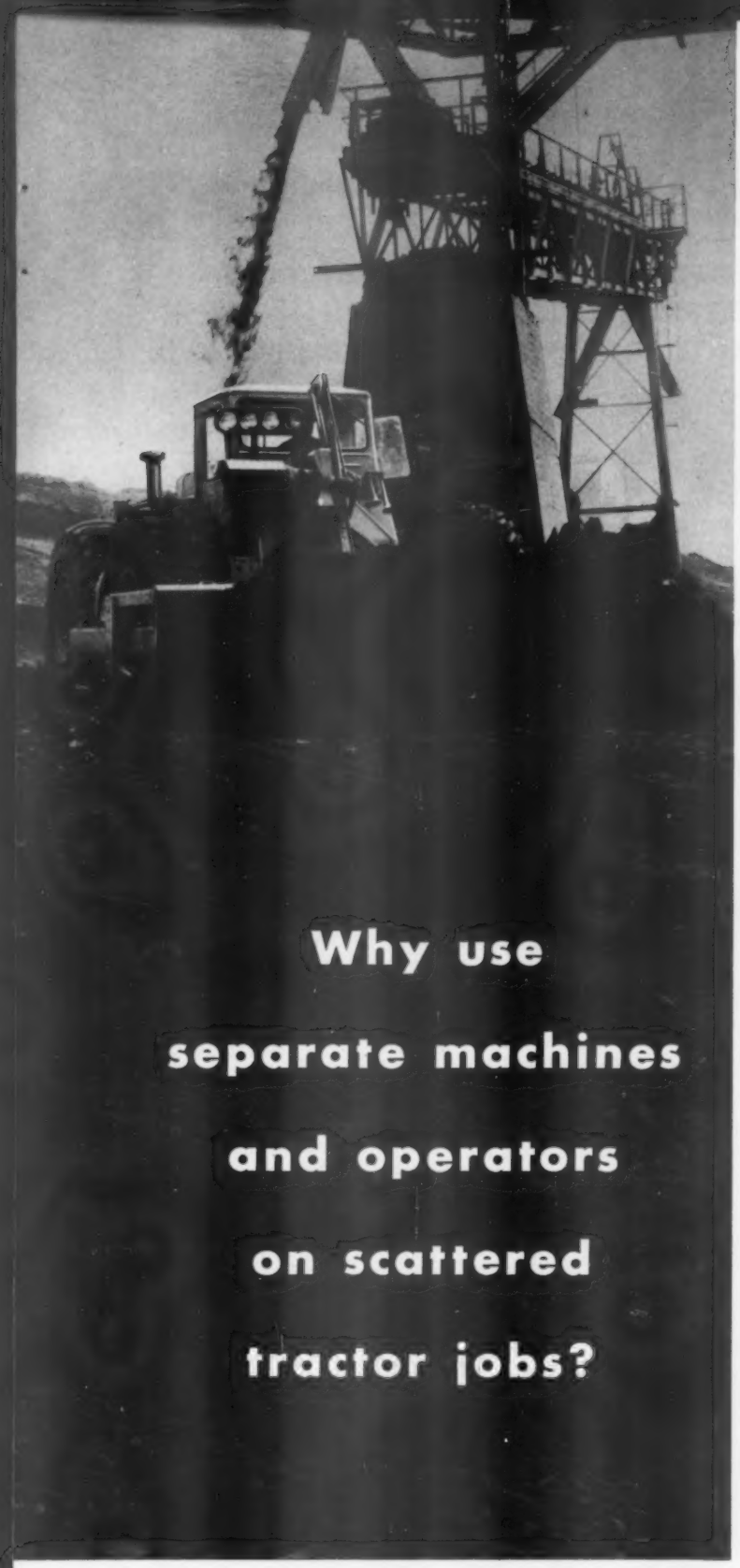


Why use separate machines and operators on scattered tractor jobs?

Handle your widely-separated pit maintenance and clean-up jobs swiftly and economically with one man and a LeTourneau-Westinghouse Tournatractor®. This rubber-tired tractor speeds to the job under its own power . . . over paved roads, down shot-banks, cross-country or over railroad tracks. There are no delays while tractor crawls to new locations.

LW tractor gives you better speed at the work area, too. Acceleration is fast, with 218-hp operating through sealed anti-friction drive. Maneuverability is quick and easy. Also, there's no loss of momentum to shift gears, because this tractor's gears are constantly in mesh. Even reverse action is *instant*.

Handles wide variety of jobs

You can use just one Tournatractor to clean-up around 2 or more shovels . . . and at the same time maintain stock-piles, level waste dumps, clean debris off RR tracks, clean benches, handle shallow stripping, tow air-compressors, or pull supply and service wagons. You can even use this speedy, mobile tractor for maintenance and clean-up in one or more adjoining pits.

Biggest tractor value today!

In addition to giving you these plus operating advantages, LeTourneau-Westinghouse Tournatractor *costs less* to own, and *much less* to maintain than a track-type tractor of comparable horsepower. Let us demonstrate this rubber-tired tractor at your pit. Watch Tournatractor perform under *your* working conditions. You'll find it can handle scattered tractor jobs faster, more efficiently, to help cut your tractor costs.

Powerful LW Tournatractor spreads and compacts conveyor-dumped mineral-bearing soil. At this plant, mobile rubber-tired tractor also pulls rail cars, handles dump maintenance, and operates a towed scraper.

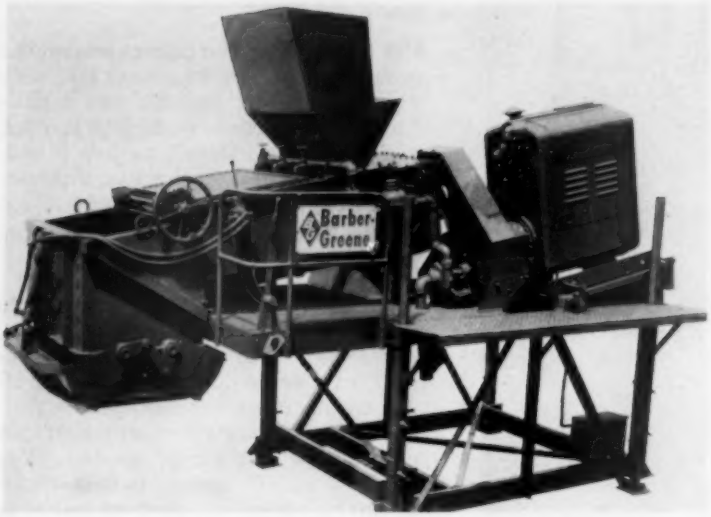
CT-2101-MQI-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

NEW MACHINERY



Sub-base mix plant handles up to 300 tph. efficiently

A STABILIZATION PLANT capable of capacities of up to 300 tph. has been announced. The new model 824 covers many applications which do not require the capacity of the company's larger stabilization plants.

Some of the advantages of this central plant mixing unit and a material handling system are: positive and accurate control of proportioning of all materials; uniform mixing; minimum amount of segregation and evaporation; and the central plant setup lends itself to better control.

This high-capacity plant can be used with many different stabilizing agents and materials. Among the many agents that can be successfully handled with the Model 824 include: water, cement, fly-ash, bitumen, chlorides and emulsions. Many local aggregate materials —crushed stone, gravel and sand, as well as clay and soil—can be used. The pugmill is equipped with water spray bars and an accurate meter-pump combination. *Barber-Greene Co., 400 No. Highland Ave., Aurora, Ill.*

Enter 200 on Reader Card

Claim increased production for wheel tractors, scrapers

HIGHER PRODUCTION and longer life are the chief gains claimed for the new DW20 Series G and DW21 Series G wheel tractors and matching Low-bowl scrapers—the new No. 456 Series B and No. 470 Series B—which were introduced recently.

In pinpointing the high-production features of the units, the maker stressed their increased power, higher bowl capacity and tire capacity and increased scraper strength.

Maximum horsepower rating of both high-speed units is now 345, up from the previous 320. The turbocharger is improved by the use of a high-performance compressor which gives higher pressures than formerly, but which operates at the same speed. New tires have 16-percent higher capacity. The most obvious improvement in the scrapers is their increased bowl capacity. Heaped capacity has been upped to 27 cu. yd. from 25. *Caterpillar Tractor Co., Peoria, Ill.*

Enter 201 on Reader Card

New plate magnets

THREE NEW MODELS of plate magnets are now in production. These magnets are designed for installation in chutes, spouts, ducts, conveyors or other processing equipment for removing dangerous iron from materials in process.

The manufacturer claims the material used in these magnets makes them superior to Alnico magnets and other ceramic magnets. This material is called Indox V and is an oriented ceramic magnetic material. According to test engineers Indox V has a superior magnetic field, is impervious to moisture, has unequalled resistance to demagnetization. Pound for pound, size for size, it costs less than Alnico magnets.

These plate magnets are made in four sizes and styles with various dimensional differences within each of the four size groups. *Stearns Magnetic Products, Div. of The Indiana Steel Products Co., 635 South 28th St., Milwaukee 46, Wis.*

Enter 202 on Reader Card

Heavy-duty lube

A NEW, HEAVY-DUTY gear lubricant available in SAE 90 and 140 grades has been announced. Made from the highest quality, solvent-refined paraffin base stock, plus a special formulation of E.P. additives, the new Molykote Type 223X is designed to provide satisfactory lubrication wherever unusual problems are encountered. It has equally good load-carrying ability through the entire range from the lowest to the highest sliding velocities, and it is most effective in reducing wear.

The new lubricant has a viscosity index of 100. Its flash point is 390 deg. F. and its fire point is 420 deg. F. Its specific weight is 7.5 lb. per gal., has a pour point at 0 deg. F.; contains a foam depressant, and is corrosion and oxidation inhibited. *The Alpha-Molykote Corp., 65 Harvard Ave., Stamford, Conn.* **Enter 203 on Reader Card**

(Continued on page 155)

SECO "Follow Through"

ANOTHER WAY OF SAYING WE SHIP STANDARD PARTS THE SAME DAY THE ORDER IS RECEIVED

OPERATION
SCREENING
EFFICIENCY

Here's still another example of our continuing recognition of responsibility to SECO screen owners. Another example of our lasting interest in your SECO screen, long after it has left the factory.

We maintain at all times a complete stock of all SECO standard parts, fabricated and machined to strictest specifications.

If you ever do need a standard replacement part for any SECO screen, we'll ship it fastest means available the same day we receive your order.

Operation "Screening Efficiency"

We know that downtime can be mighty costly to you . . . that's why we build SECO screens right in the first place to minimize parts replacement needs and why we follow through with swift delivery if the need arises. Another reason you're better off with SECO screens.

SCREEN EQUIPMENT COMPANY, INC.
BUFFALO 25, NEW YORK

SECO NO. 1 NEARS QUARTER CENTURY OF SERVICE

Way back in the mid-thirties, the first SECO screen went into service at Cortland, New York. Today, this tried and true workhorse is still on the job giving stouthearted service without a whimper.

Send for SECO 4-Bearing Catalog 204 or Twin Bearing Booklet TB-21.

SECO
TRUE CIRCULAR ACTION
VIBRATING SCREENS

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PROCEED, DEFER OR MODIFY?

Kaiser Engineers can help you decide

Objective analysis is vital to sound decision on new plant or expansion projects. Feasibility studies, economic analyses and site evaluations are yours by an outside, impartial firm when Kaiser Engineers is selected to help you decide when, how and where to proceed.

These services are in addition to the design and construction of major facilities for the Minerals industry.

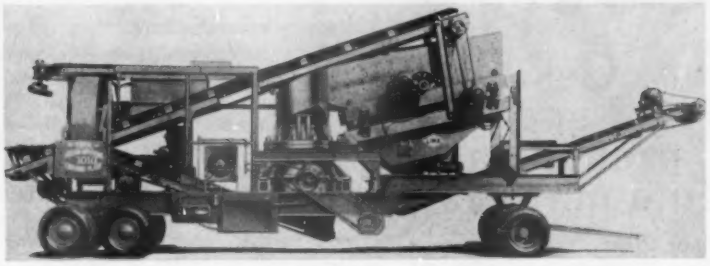
KE offers complete, one-company, integrated service from concept through construction—plus world-wide experience and the ingenuity to build quickly, within budget.

KAISER ENGINEERS

Division of Henry J. Kaiser Company
Oakland 12, California
Pittsburgh, Washington, D. C., Chicago, New York

• KE projects include work in Australia, Brazil, Ghana, India, New Zealand, as well as Canada and the United States. Assignments include iron ore concentrating plants, cement plants, bauxite and alumina processing plants and diatomaceous earth facilities.

Enter 1276 on Reader Card



Versatile cone crusher for portable and stationary plants

A 36-IN. HYDROCONE crusher that produces a greater output with reduced fines, wear, maintenance, and space requirements has been introduced. The new crusher, which includes hydraulic adjustment of the crushing head, is available with feed openings of 7, 4 and 2 in.

The combination of accurate controlled size setting and short throw produces a high percentage of usable product with less finely sized material. Increased range of the machine's eccentric throws gives a tailor-made throw for each specific application, according to the maker.

Portable and stationary plants have proved the versatility and production advantages of this new crusher. The Model 736 is for coarse crushing, the 436 for medium, and the 236 for fine crushing. *Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.*

Enter 204 on Reader Card

Low-range oxygen analyzer

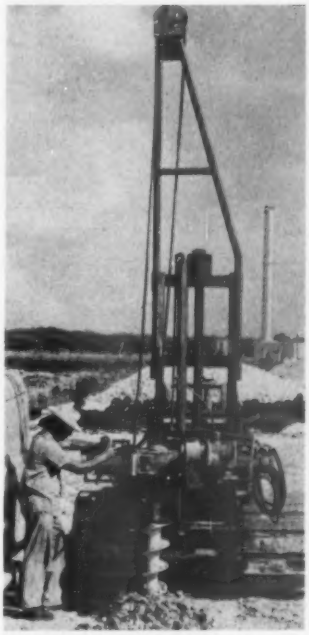
AN ANALYZER specifically developed for measurement of low concentrations of oxygen is being introduced. Designated Model 632, the analyzer is available in three different ranges: 0 to 1 percent, 0 to 2 percent, 0 to 3 percent. The analyzer is not affected by hydrogen concentrations up to 50 percent, but is sensitive to changes as low as .01 of 1 percent oxygen, and accurate to plus or minus 2 percent of range. The hydrogen insensitivity makes the unit particularly well suited for O_2 measurement in inert gas atmospheres.

The Model 632 uses a new concept of the principle that oxygen is paramagnetic. The analyzer incorporates a basic Wheatstone Bridge resistance circuit within a recorder to provide a continuous record of oxygen content by measuring variations in the paramagnetic properties of the sample gas.

The new low-range oxygen analyzer provides extremely fast response (time constant: 4 to 7 sec.) to fluctuations in oxygen content. There are no moving parts in the instrument. *The Hays Corp., Michigan City, Indiana.*

Enter 205 on Reader Card

Drill rig



A TRACTOR-MOUNTED DRILL for crawler tractors now is available. The B-40 "Explorer" is a compact, all-purpose drilling rig. It is designed for diamond drilling in hard rock formations to depths of 250 ft. through a drilling speed range from 50 to 600 rpm.

In semi-consolidated material, the Explorer is equally effective as an auger drill. Five-foot continuous-flight sections can be used to auger down to 75 ft. in clay or gravel, with 4½-in. diam. augers.

Quickly convertible from one type drilling to another, the B-40 has a steel beam and tubular frame weldment fabricated to a full-width face plate, which bolts to the rear face of the tractor frame. *International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill.*

Enter 206 on Reader Card

Integral reducer pulley

A COMPACT CONVEYOR DRIVE has been developed. This unit is available from 1 to 10 hp. and can be supplied

in 30 different ratios ranging from 2½ to 1 up to 215 to 1. The reducer is completely enclosed in a dust-tight pulley from which it can be quickly removed by loosening 6 bolts. Pulley diameters start at 12 in. *The Crichton Co., Johnstown, Pa.*

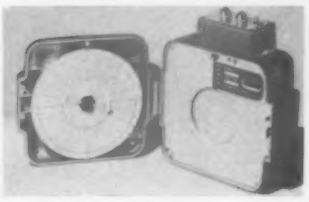
Enter 207 on Reader Card

Engine speed controller

DESIGNED TO AID OPERATORS of off-the-road diesel trucks who are seeking to reduce mounting maintenance expenses and capital equipment costs, a manufacturer of time recorders has developed and introduced a new engine speed recorder.

Representing a new concept in engine speed recorders, these units offer a visible engine speed control. An indicator is set to flash warning lights if the engine reaches too high, or too low, rpm. The driver can keep engine speed within management-specified limits. A red light on the unit flashes when engine rpm. goes too low, and an amber light comes on when rpm. passes safe and efficient limits.

Lugging and overdriving can be re-



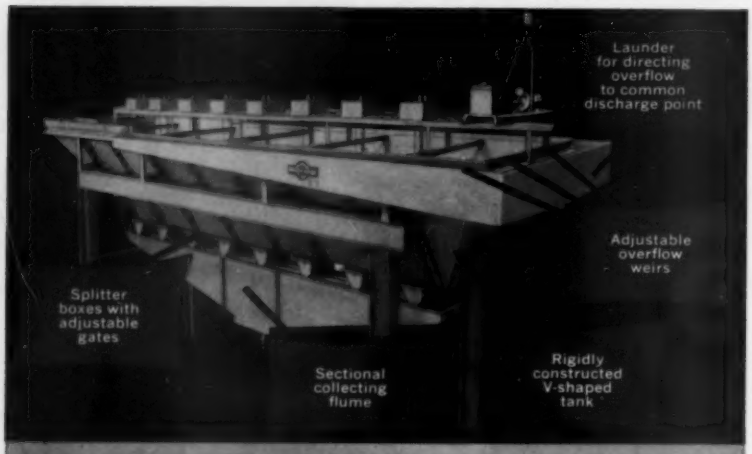
duced drastically with the use of the new multi-purpose speed recorder. It makes an accurate record of diesel engine speed in rpm. *The Service Recorder Co., 1013 Rockwell Ave., Cleveland 15, Ohio.*

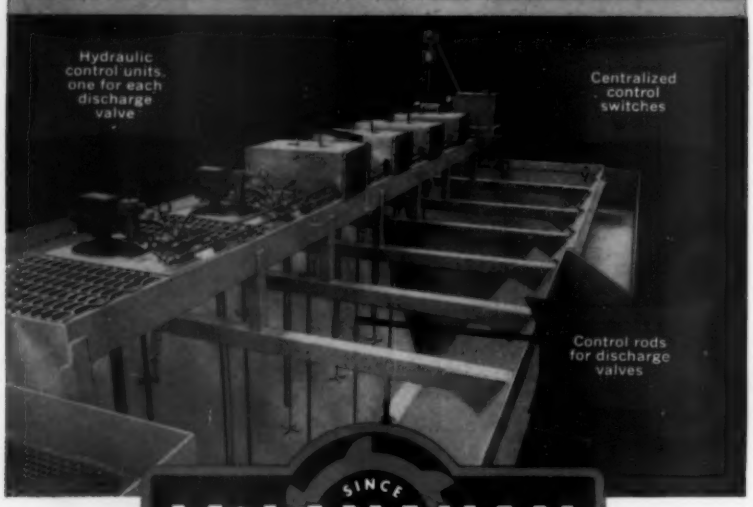
Enter 208 on Reader Card

(Continued on page 156)

Most Effective Design for classifying and scalping excess water from fine materials

Single, double or triple collector flume construction—with a full range of sizes for various capacities. *Ask for Bulletin SC-59.*


Launder for directing overflow to common discharge point
Adjustable overflow weirs
Splitter boxes with adjustable gates
Sectional collecting flume
Rigidly constructed V-shaped tank


Hydraulic control units, one for each discharge valve
Centralized control switches
Control rods for discharge valves

SINCE 1835 McLANAHAN

SAND CLASSIFYING TANKS

McLANAHAN & STONE CORPORATION

252 Wall Street • Hollidaysburg, Pennsylvania

Enter 1261 on Reader Card

NEW MACHINERY

(Continued from page 155)

Rotary vibrator screen

AN ELECTROMECHANICAL SCREEN driven by a powerful rotary vibrator efficiently handles a wide variety of applications. Known as the RVS-146, it is fitted with dust-tight covers to prevent loss of materials and reduce dispersion. A 4 x 6-ft. screening surface will handle dry or wet screenings of sand, gravel, clay, rock and other heavy bulk materials in sizes ranging from 100-mesh to 3-in lumps.

The RVS-146 is available with single or double-deck screening areas and can be equipped with either a 900 or an 1,800-rpm. drive. It can be supplied without dust-tight covers as well, and can be floor or suspension mounted. *Syntron Co., 322 Lexington Ave., Homer City, Pa.*

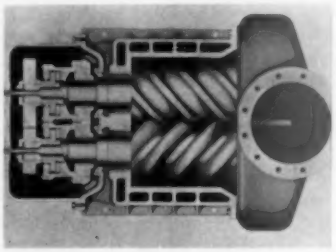
Enter 216 on Reader Card

60-kw. generating plant

THE DEVELOPMENT of a new 60-kw. diesel electric generating plant has been announced. A new addition to this company's line of electric plants, the new 60-kw. unit, Model CD-6018, is a unitized three-phase, 60-cycle set, with an output of 120/208 v. ac. The unit has a speed of 1,800 rpm. developed by a water-cooled six-cylinder diesel engine. Standard equipment includes 24-v. electric-starting and battery-charging systems. *Jeta, Inc., Yonkers, N.Y.*

Enter 217 on Reader Card

Rotary compressor



A NEW POSITIVE-DISPLACEMENT rotary compressor is designed for continuous heavy-duty industrial service handling air, gas or vapor. With a standard capacity range of 800-13,000 cfm., it is expected to have wide application in the process industries for both pressure and vacuum systems including industrial and instrument air.

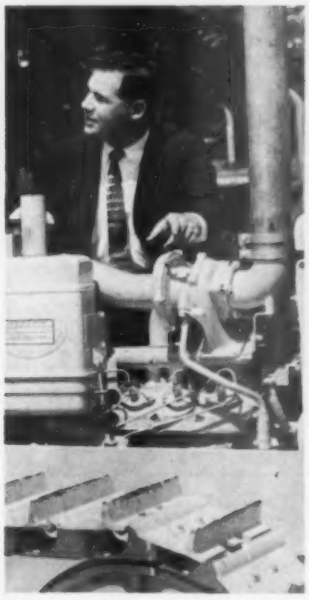
The compressor is a two-impeller,

helical-lobe type, axial-flow rotary machine with four-lobe power impeller and a secondary impeller with six matching gaps synchronized by timing gears. The impellers rotate with a pure rolling motion and power is transmitted to the secondary impeller through the cushion of compressed gas. There is never any metal-to-metal contact between impellers or with the surrounding casing, making it unnecessary to lubricate the impellers. *Fairbanks, Morse & Co., Chicago, Ill.*

Enter 209 on Reader Card

Small turbocharger

THE SMALLEST TURBOCHARGER now in production, no larger than a salad plate and weighing only 24 lb., has been developed. Fitted to 2 six-cylinder diesel engines, the 7¾-in. diam. turbocharger boosts power output by 23 percent over that of a naturally-aspirated engine. The advantages of turbocharging—more power and fuel savings—are available for the first time in small crawler tractors with the manufacture of this miniature turbocharger.



The unit consists essentially of a single-stage centrifugal compressor mounted on a common shaft with a single-stage-radial inflow turbine, a one-piece main housing, a turbine housing and a compressor housing. The turbine wheel, which drives the compressor impeller during operation, is actuated by the engine exhaust gases. *International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill.*

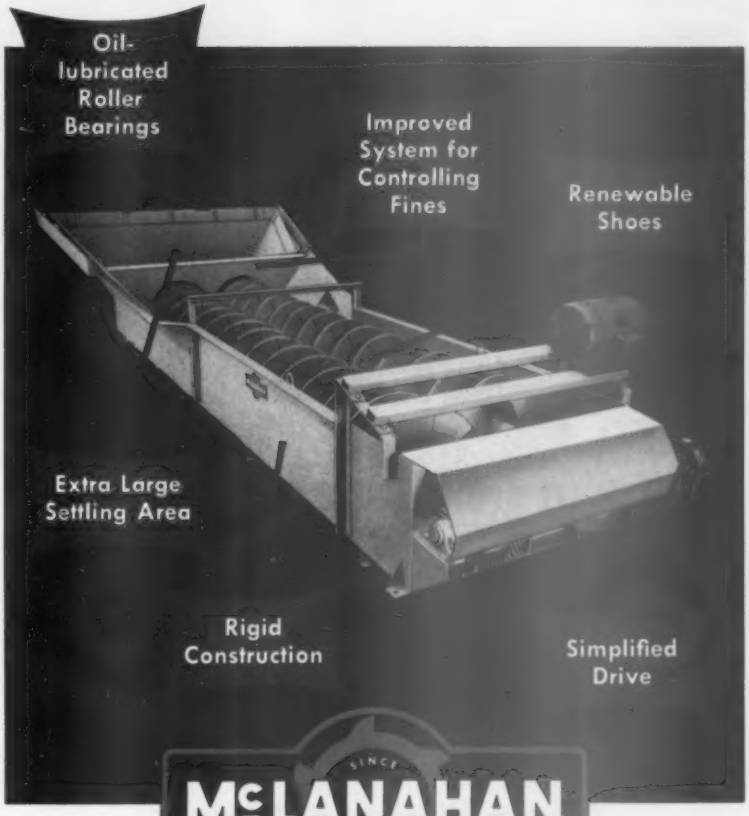
Enter 210 on Reader Card

(Continued on page 164)

PROFITABLE TONNAGES

of cleaner, drier product

More effective performance in a broad range of operating conditions . . . heavier construction for longer service—those fundamentals make McLanahan Single or Double Screw Washers your soundest buy. *Write for New Bulletin No. SW-58.*



McLANAHAN

SCREW WASHERS

McLANAHAN & STONE CORPORATION

252 Wall Street Hollidaysburg, Pennsylvania

Enter 1257 on Reader Card

Key to growth and profit for Marquette Cement

With capacity at new peaks, Marquette Cement is turning to modernization programs to help maintain the profit margin in these days of rising costs and increasing competition.

And at Marquette, engineer, controller and production man alike recognize the advantages of modern instrumentation and automation to help achieve their goals.

For instance, at their Nashville, Tennessee plant, low-cost high-quality clinker is being produced with the help of new instrumentation by Leeds & Northrup, the *most experienced* supplier of instruments and controls to the industry.

Using economical Speedomax® Type H recorder-controllers as basic measuring and control instruments, this new system, constructed by Allis-Chalmers, provides for automatic control of the 5 most important kiln conditions and continuous recording of 4 additional critical variables.

Like Marquette, other major producers are taking long hard looks at the future . . . examining processes for savings through instrumentation.

And they're finding that instrumentation *can* help widen the profit margin . . . not only in the kiln department but throughout the plant . . . in raw material handling, blending and grinding.

Your Leeds & Northrup engineer can show you now how proven L&N systems have helped others toward growth and profit. Call him at your nearby L&N office, or write to 4975 Stenton Avenue, Phila. 44, Pa., for diagrams and data sheets.

LEEDS Instruments [N] NORTHRUP Automatic Controls • Furnaces

Enter 1309 on Reader Card

Enter 1310 on Reader Card

HERE'S A ONE MACHINE FLEET

TROJAN 404 MAINTAINS ALL TOWNSHIP ROADS WITHOUT ASSISTANCE

A "one machine fleet" best describes the everyday performance of the Trojan Model 404, purchased by the Township of LeRoy, New York. Mobility, plus Trojan's thirst for work, has shrunk the size of the Township and taken over jobs normally handled by other types of equipment . . . Hank Sheridan, superintendent of roads for the Township says, "Right now we're using our rig for loading haul trucks here in a gravel pit. Tomorrow we might be using it to pull out trees 20 miles from here; or cleaning up fence rows 15 miles from the trees; or any of a number of other duties this multi-purpose rig has taken over . . . Working in conjunction with our portable crusher, the Trojan 404 proved so productive we had to hire another truck to back up the three we already own." The Trojan 404 is doing a job for LeRoy, it can do the same for you . . . Contact your local distributor — let him demonstrate Trojan ability.

THE YALE & TOWNE MANUFACTURING COMPANY
TROJAN DIVISION BATAVIA, NEW YORK SAN LEANDRO, CALIFORNIA

TROJAN®
TRACTOR SHOVELS
YALE & TOWNE

READER-SERVICE CARD RP-9-59

Quaker Thermoid THUNDERBIRD...

the toughest (yet most flexible) air hose you've ever used

Give Thermoid-Quaker THUNDERBIRD Wire-Braid Hose the works . . . the roughest kind of impact, twisting, crushing, inside pressures. It'll take everything you can deal out, and then some.

THUNDERBIRD takes this punishment while remaining the most flexible, non-kinking air hose you've set eyes upon. Accurately-controlled angle of wire braid assures this extreme flexibility. Tough neoprene tube resists hot or cold oil. Yellow neoprene cover provides maximum abrasion-resistance and high visibility even in the dark.

Sizes from ¾" to 4" I.D. Working pressures to 400 psi air or 2,000 psi water. Lengths to 50 feet. Ask your Thermoid distributor about THUNDERBIRD, or write *Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Sts., Phila. 24, Pa.*

THERMOID DIVISION PORTER **H. K. PORTER COMPANY, INC.**

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO, S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

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READER-SERVICE CARD

RP-9-59

ROCK PRODUCTS
79 W. Monroe St.

SEPTEMBER, 1959
Chicago 3, Illinois

Cannot be serviced after November 1, 1959 postmark.

Please print or type

Name_____ Position_____

Company (In Full)_____

Company Address_____ City_____ Zone____ State_____

Send information on items identified by key numbers beside or below items of interest to you. List your choice in numerical order. Limit 10 per card.

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IF NO KEY NUMBER, USE COMPANY NAME

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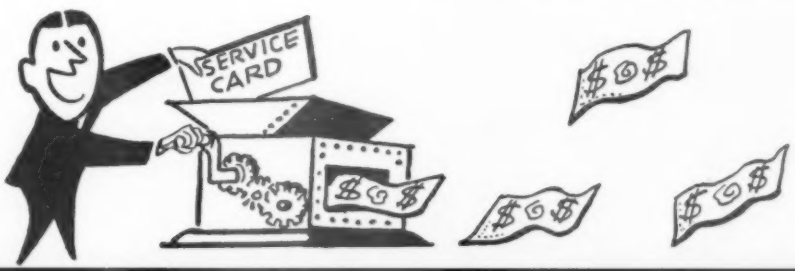
ROCK PRODUCTS
79 WEST MONROE ST.
CHICAGO 3, ILL.

MONEY MAKING IDEAS FOR YOU - - - FREE

HOW TO USE THIS SERVICE

1. **Advertised Products**
2. **New Machinery**
3. **New Literature**

There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.



BUSINESS REPLY CARD
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There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.

YOU'RE AHEAD

because the specialized experience of two pioneer companies in front-end loaders is now combined . . .

ALLIS-CHALMERS
—pioneer of the world's first successful hydraulically-controlled crawler-mounted tractor shovel.

result of 14 years' leadership

TRACTOMOTIVE
—one of the first to develop heavy-duty rubber-tired loaders.

result of 11 years' leadership

Now Tractomotive Corporation has become part of Allis-Chalmers . . . and that means we'll be able to serve you better than ever. One very important reason is that the specialized experience of each organization in its field cannot be surpassed.

Allis-Chalmers pioneered its history-making HD-5G in 1945 . . . has led the field in crawler shovel design and performance ever since . . . now offers the most complete line of such equipment in the industry, with bucket sizes from 1½ to 7¼ cu yd.

The Tractomotive team has been building heavy-duty wheel loaders since 1948 . . . has consistently pioneered developments of great value to users, including torque converter drive and single-lever shifting control.

Through the combined facilities of these two pioneers, we offer you industry's most complete line of front-end loaders, on rubber or tracks . . . with these added basic advantages to back it up!

- another modern plant joins Allis-Chalmers' extensive facilities for manufacturing construction machinery
- a company-wide record of engineering leadership in all types of heavy-duty equipment
- widespread research activity that insures continuing progress
- original factory parts and blue-chip parts control
- increased man power in sales and service

See 'em at work—your Allis-Chalmers dealer will be glad to demonstrate the machine of your choice—wheel or track-mounted, whichever meets your job needs best. Just give him a call. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

YOU'RE AHEAD with a TRACTOLOADER

...a complete line now built and backed by Allis-Chalmers

Seven models—34 to 130 hp—up to 9,000-lb carry capacity. Torque converter drive in every model.

move ahead with ALLIS-CHALMERS

...power for a growing world

Enter 1307 on Reader Card

In Cement and Aggregates the Word for Air Separation is "Sturtevant"

in cement . . .

Sturtevant Air Separators make possible highly efficient closed-circuit systems. Large circulating loads increase output, eliminate overgrinding. Ball and lining life lengthens, power costs are lowered. Top quality cement results from precise control of finenesses. Standard 16 ft. Sturtevants deliver raw fines up to 70 tph, finished fines up to 260 bph.

in aggregates . . .

Sturtevant Air Separators classify sand without water, clean sand by de-dusting it. Pre-classification by air can also increase screening production by removing screen-blinding fines. In blending operations, Sturtevants select desired fines from grinder throughput. This graded product is then used to overcome fineness modulus deficiencies.

Send for Air Separator Bulletin No. 087.

STURTEVANT
MILL COMPANY
102 Clayton St., Boston, Mass.

Crushers • Grinders • Micron-Grinders • Separators
Blenders • Granulators • Conveyors • Elevators
Enter 1260 on Reader Card

(Continued from page 157)

Crawler tractor

NEWEST ADDITION TO THIS manufacturer's crawler tractor line is the OC-9, equipped with power-boosting torque converter. It offers a new concept in steering, Trans-O-Matic, which utilizes counter-rotating tracks to provide the shortest turn for any crawler tractor of its size.

When fitted with 1-cu. yd., front-end-loader bucket, the machine has exceptional stability for loading sand, gravel, rock, slag and other heavy materials. Features like directional power shift, torque converter and short-range turning provide this unit with exceptional maneuverability and high speed operation. *The Oliver Corp., 400 W. Madison St., Chicago 6, Ill.*

Enter 211 on Reader Card

Hammermill

A HYDRAULICALLY-ADJUSTED hammermill crusher, Model 4034, marks the entry of its manufacturer into the hammermill field. All wearing parts of the hammermill are manganese steel castings. Breaker plates are reversible; adjustment is simplified by means of hydraulic jack and shims. Grate bars are available with size openings from ¼ to 3 in. These can be arranged to produce the desired product. *Pioneer Engineering Div. of Poor & Co., Inc., Minneapolis 14, Minnesota.* **Enter 212 on Reader Card**

Timing device

A 30-MIN. SYNCHRONOUS motor-driven timer is the newest timing device offered. The new unit features positive time selection and visual time indication. Since the dial is marked off in minutes with half-minute graduations, exact time is selected simply by rotating a bronze pointer to the timing cycle required. While in operation, the timer dial shows the full timing interval and the time remaining in the cycle. In case of power failure the timer automatically returns to its starting position for a full cycle when power returns.

The timer is designed for "on-the-job" interchangeability with either the 1, 3 or 5-min. timing units. Each of the four will fit the same terminal and mounting block assembly. *Cutler-Hammer Inc., 301 N. 12th St., Milwaukee, Wis.* **Enter 213 on Reader Card**

Scrapers

TWO NEW SCRAPER MODELS are described as having high power per pound and the greatest cutting width in their 31-cu. yd. (heaped) class. Both the 295 and 495 Payscrapers feature a 375-hp. turbocharge diesel engine, which has valve rotators for long life, wet sleeves for top cooling and a fully balanced crankshaft for peak engine efficiency.

Scraper bowls in the two units have a tapered design with extra-wide spread, quick dirt breakaway. The wide bowl means both scraper and pusher work inside the cut, giving top traction, less tire and track wear. The 495 Payscraper has a two-axle prime mover which permits speeds to 29.1 mph. The 295 Payscraper is a two-wheel prime mover which features outstanding maneuverability; at 45 ft., it is nearly 6 ft. shorter than the 495, and can turn more sharply. *International Harvester Co., 181 N. Michigan Ave., Chicago 1, Ill.* **Enter 214 on Reader Card**

Largest fluid energy mill

A 42 IN. DIAM. fluid energy mill, the largest ever manufactured, has been fabricated and shipped. The giant mill increases grinding capacity 50 percent over the 36-in. unit, formerly the largest unit produced. It has a maximum capacity of from 750 lb. to over 3 tph., depending upon material and fineness desired. The new mill will be used to grind titanium dioxide to the unmeasureable micron and submicron range. *Sturtevant Mill Co., 102 Clayton St., Boston 22, Mass.*

Enter 215 on Reader Card

(Continued on page 168)

for maximum fire power

KENNEDY KILN FIRING SYSTEMS

When seeking economies in rotary kiln operation, either through decreased fuel consumption or increased kiln capacity, look first to your firing system. These economies are dependent primarily upon a perfectly balanced and controlled fuel and primary air supply. This is inherent in all KENNEDY Kiln Firing Systems.

Whether your fuel be coal, gas or oil—or any combination of these—a KENNEDY Kiln Firing System will burn it most economically. This results in improved heat transfer and uniformity of kiln temperature.

A KENNEDY Kiln Firing System answers the need for "Maximum Firepower."

FOR PULVERIZED COAL—KENNEDY's Air Swept Grinding Mill, proven in many successful steam power plants, cement plants, and lime plants, supplies properly-sized coal particles to the burner, combined with exactly the right quantity of primary combustion air. Low maintenance, reliability, automatic feed control, quick response to changing loads and replacement of grinding media without shutdown, make this the ideal system for kiln or boiler firing service.

FOR GAS—The KENNEDY Gas Firing System is the only system which produces a luminous flame, of adjustable length, assuring maximum radiation of heat with maximum efficiency over a wide range of capacity.

FOR OIL—Fuel Oils of any grade yield maximum heat per fuel dollar when burned in a KENNEDY Kiln Firing System.

Take advantage of the added economy and performance which is characteristic of KENNEDY Kiln Firing Systems. Consult KENNEDY's engineers.

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405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

CRUSHERS • PULVERIZERS • KILNS • PREHEATERS • DEHEATERS • SCREENS • CONVEYORS • HYDRATORS • COMPLETE LIME & CEMENT PLANTS • KENNEDY RESEARCH & TESTING SERVICE

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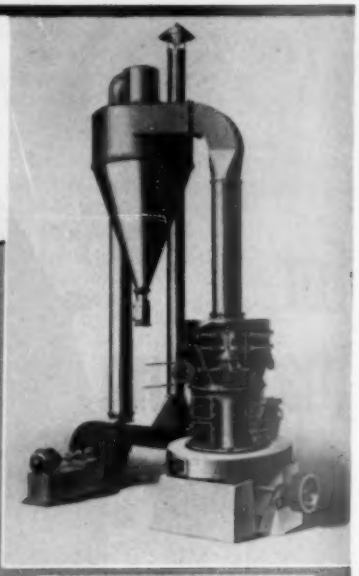
RAYMOND

GRINDING MILLS

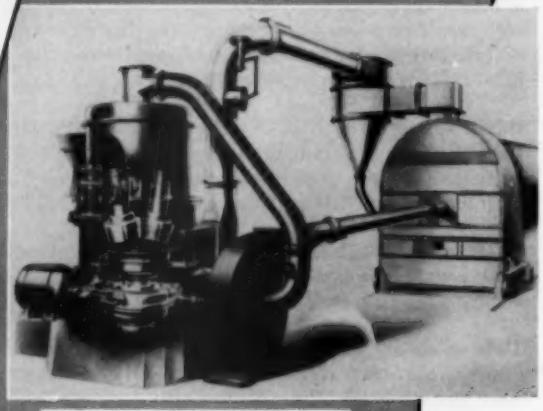
for many materials
capacities and
finenesses



RAYMOND ROLLER MILL
Whizzer-Equipped

IMP MILL WITH
FLASH DRYING

VERTICAL MILL FOR
HIGH FINENESS



BOWL MILL for Direct Firing

WHEN you have an individual problem, you naturally go to a specialist . . . and in the same way . . . whatever your grinding requirements may be, you can serve your own interests best by placing your problem in the hands of Raymond engineering specialists with over a half-century of experience in the design and manufacture of pulverizing and separating machinery.

Raymond builds a complete line of mills to fit your plant, process and product . . . capacities from a few pounds up to forty tons per hour . . . finenesses from 20-mesh to micron materials in the sub-sieve sizes . . . combination units for simultaneously grinding, drying, classifying . . . or direct-firing coal.

They are designed for automatic control and clean, dust-free operation . . . "tailor made" to your needs to insure efficient performance, long service and low maintenance.

Raymond Bulletins describing the above mills will be sent on request

COMBUSTION ENGINEERING, INC.

Raymond Division

1108 W. BLACKHAWK ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN
PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

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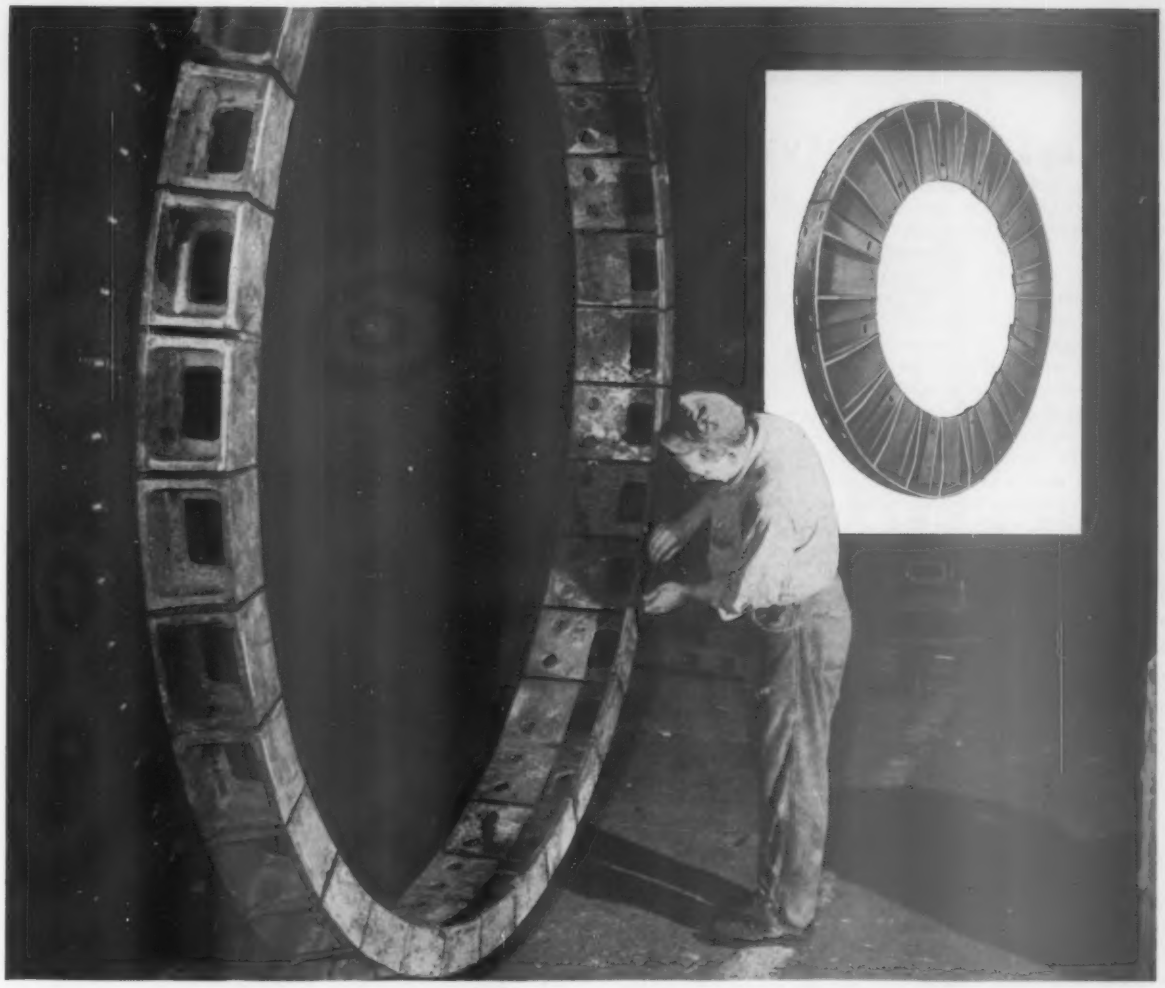

IN CEMENT, LIME, AND DOLOMITE PLANTS...

B&W Nose and Tail-Ring Castings Demonstrate Longer Continuous Service

Longer brick life and longer continuous service are being attained by 275 kilns in 54 plants using B&W Nose and Tail-Ring Castings. In many cases, the life of these castings has exceeded 9 years.

Light and strong B&W Alloy Castings have improved kiln performance in most installations. Made of heat-resisting Grade HH alloy, nose ring castings eliminate belling out of the kiln shell, assuring longer brick life and longer continuous operation of the kiln. By protecting the end of the kiln shell from direct flame, the nose ring castings prevent "feathering-down" of the shell because of oxidation. Their design eliminates cracking and warping, experienced with large size castings.

Small size and light weight make B&W Castings easy and inexpensive to install. The protecting flange on the nose ring castings permits the use of low-alloy steel bolts for fastening.

Spare part inventory may be kept low because the same nose ring castings may be used on kilns varying up to 4 feet in diameter, depending upon size. Write for Bulletin S-17. The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

5-467

B&W THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

Enter 1248 on Reader Card

(Continued from page 164)

Laboratory calciner

A RESEARCH-SIZE continuous rotary calciner and cooler is now offered to the rock products industries. This experimental unit is ideally suited for continuous heating and cooling of oxides, salts and carbonaceous materials in a neutral, oxidizing or reducing atmosphere. Material can be heated to a maximum of about 2,000 deg. F. and cooled to the range of 150 to 200 deg. F. before discharge.

These units are available for laboratories to develop new products; provide a means of determining permissible operating temperatures, retention times, and special atmospheres; produce valid samples of the product that can be expected from full-size production units; provide data to guide the design and operation of efficient, full-scale plant facilities.

These units are available in two sizes, approximately 3½ ft. wide by 9 ft. long over-all or 14 ft. long. Both types can be fuel fired or electrically heated. *The C.O. Bartlett & Snow Co., 6200 Harvard Ave., Cleveland, Ohio.* **Enter 218 on Reader Card**

Welding and cutting outfit

A NEW, MODERATELY PRICED gas welding and cutting outfit, called the Aircomite, has been announced. With this new outfit, operators can weld steel up to ⅜ in. thick, cut up to 1-in. steel plate, braze and hardface. Built for light and medium duty industrial service, it is ideal for maintenance purposes.

The outfit includes one oxygen and one acetylene regulator, one welding torch with three tips, one cutting attachment and tip, one pressure mixer with gas sealing rings, a pair of welding goggles, 12½ ft. of $\frac{3}{16}$ in. neoprene-lined twin hose with connections, one sparklighter, and one all-purpose wrench. *Air Reduction Sales Co., Div. of Air Reduction Co., Inc., 150 East 42nd St., New York 17, New York.* **Enter 219 on Reader Card**

Chute liner

A NEW CHUTE LINING, known as "Rifflestrip," is offered to the rock products industry. The material represents a new engineering approach to the problem of protecting steel or wooden chutes from the ravages of abrasive materials, according to the maker.

The Rifflestrip bed is developed from a number of individual L-shaped, 2-in. strips of pure gum rubber. The strips are placed together tightly with the riser of each L-shaped strip forming a series of parallel ridges across the chute. The ¾-in. rubber base of each "L" section forms a continuous protective liner for the chute. The strips are then nailed to wooden chutes or bolted to metal chutes.

Abrasive material immediately fills the grooves between the ridges. The material then runs over itself, has nothing to abrade but itself. There can be no wear on the rubber or the chute.

Rifflestrip chute lining is recommended for use on chutes, launders, hoppers and other wearing surfaces handling sand or gravel; on systems handling slimes or tailings; on mixing tubs handling abrasive, dry mixtures. *B. F. Goodrich Industrial Products Co., Akron, Ohio.* **Enter 220 on Reader Card**

(Continued on page 170)

HOLZ
Vulco-Lagged PULLEYS

GRIP BETTER to keep traction UP

DRIVE HARDER to keep production UP

WEAR LONGER to keep profits UP

HOLZ Vulco-Lagged PULLEYS step up performance and eliminate seasonal maintenance to save you dollars and downtime! Tough, abrasion-resistant lagging of specially compounded rubber is permanently bonded to metal pulleys for positive, non-slip driving. Pulleys run longer without re-lagging*; belts run longer without renewing! Get the full story: write for detailed information today.

*Up to 10 years operation reported on HOLZ Pulleys.

VULCO-LAG PULLEY

"IF IT'S RUBBER, WE CAN MAKE IT!"
SERVING INDUSTRY FOR A QUARTER CENTURY

HOLZ RUBBER COMPANY, INC.
1137 SOUTH SACRAMENTO STREET • LODI, CALIFORNIA
Dealer inquiries solicited.

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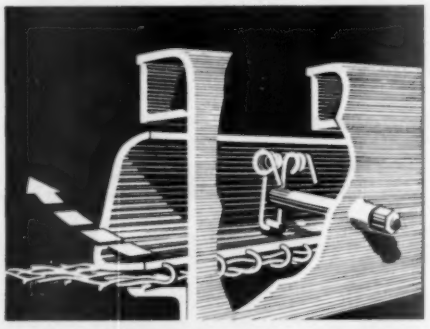
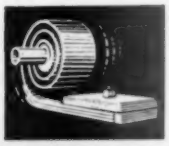


MONEY-MAKER!

Overstrom's patented cloth-tensioning device makes screen changing easier and faster . . . really pays off!

WRITE DEPT. RP-5 (Address Below) FOR NEW EIGHT-PAGE CATALOG



OVERSTROM & SONS, INC.
2213 WEST MISSION ROAD • ALHAMBRA, CALIF.

Enter 1263 on Reader Card
Enter 1266 on Reader Card

The New 30-R

has what it takes—and is ready to prove it

Check the specs . . . check the performance . . . you'll find the new Bucyrus-Erie 30-R offers the same outstanding stamina, speed, and ease of operation that make the 40-R and 50-R the most popular blast hole drills in their classes — *by far.*

THE ADVANTAGES ARE ALL THERE — IN A NEW ECONOMY SIZE

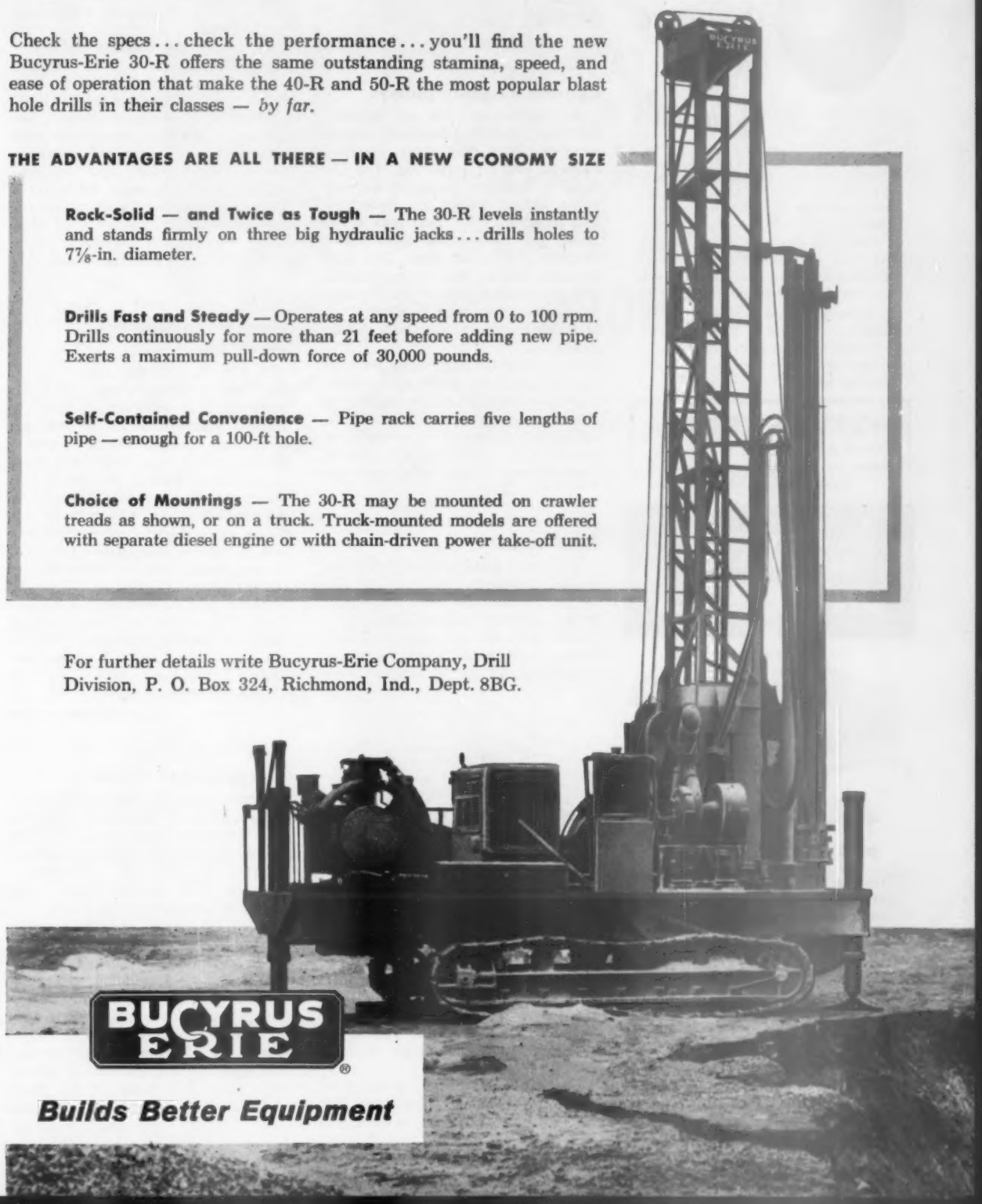
Rock-Solid — and Twice as Tough — The 30-R levels instantly and stands firmly on three big hydraulic jacks . . . drills holes to 7⅞-in. diameter.

Drills Fast and Steady — Operates at any speed from 0 to 100 rpm. Drills continuously for more than 21 feet before adding new pipe. Exerts a maximum pull-down force of 30,000 pounds.

Self-Contained Convenience — Pipe rack carries five lengths of pipe — enough for a 100-ft hole.

Choice of Mountings — The 30-R may be mounted on crawler treads as shown, or on a truck. Truck-mounted models are offered with separate diesel engine or with chain-driven power take-off unit.

For further details write Bucyrus-Erie Company, Drill Division, P. O. Box 324, Richmond, Ind., Dept. 8BG.



BUCYRUS ERIE®

Builds Better Equipment

Every minute of busy and idle time is recorded on tamper-proof charts.

Servis Recorder lets you know if equipment is busy or idle!

Can Save You Thousands

This simple $40 instrument bolts to any shovel, grader, haul truck or other machine. It makes a record of when equipment is busy and when it is idle. Now you can know exactly how busy every piece of equipment has been kept every day of the week even when you're not around.

Six recorders saved one firm $40,000. Even one recorder could save you from making an unnecessary purchase of additional equipment. Send for illustrated folder today.

The SERVICE RECORDER Co.
1015A Rockwell Ave., Cleveland 14, Ohio

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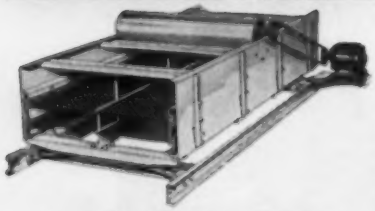
UNIVERSALS



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- **DEPENDABLE**
- **ECONOMICAL**
- **STOCK DELIVERIES**
- **FAST SERVICE**

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UNIVERSAL VIBRATING SCREEN CO.
Racine, Wisconsin
Quality Screens Since 1919

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NEW MACHINERY

(Continued from page 168)

Ceramic magnetic pulleys

AN IMPROVED LINE of ceramic-powered, radially designed pulleys more powerful than those currently available are in production. The Ceramic-V magnetic poles of the new pulley extend around the circumference resulting in a field that varies across the face, being most highly concentrated at the poles. The deep magnetic field of the radially designed pulley is more effective in the removal of medium and large tramp iron at high belt speeds and with belts thicker than ⅜ in.

Ultra Hi-Powr and Super Hi-Powr ceramic magnetic pulleys are offered in five standard diameters from 12 to 24 in., and in belt widths from 12 in. up. Larger diameters are available on special order. *Eriez Mfg. Co., Erie 6, Pennsylvania.* **Enter 221 on Reader Card**

New trucks

TWO NEW REAR-DUMP, off-highway trucks—featuring powerful, new diesel engines and exclusive, corrugated bodies—now are in production.

The units are the Model 95 Payhauler, with heated body, a struck capacity of 18 cu. yd. and a 27-ton

payload, and the Model 65 Payhauler, with a struck capacity of 12.5 cu. yd. and a 19-ton payload.

The larger Payhauler is powered with a turbocharged diesel, the DT-817, with 375 hp. at 2,100 rpm. For the Model 65 Payhauler, there is the naturally-aspirated D-817 engine, developing 250 maximum hp. at 2,100 rpm.

Speeds up to 38 mph., to match all loads and roads, are obtainable with the Model 95. There is a choice of torque converter with power-shift, or nine-speed, air-shift transmission.

The 65 Payhauler—claimed to be the only 19-ton, off-highway truck on the market—delivers speeds to 36.46 mph. through a 10-speed, constant-mesh transmission.

Both units offer fast reversing, up to 7.1 mph. in the gear-drive Model 95, to speed spotting or positioning for dumping.

Many new cab comfort and driver safety features have been incorporated in the Model 95 and 65 Payhauler trucks. There is a large, adjustable seat; a 68-percent-larger, tilt-forward, non-glare windshield with more window area; six large vents for hot weather comfort, and improved braking for faster stops, including a Torqmatic brake on the 95 for greater downgrade safety. *International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.* **Enter 222 on Reader Card**

Tungsten carbide-lined micronizers

TUNGSTEN CARBIDE-LINED micronizer fluid-energy mills are now available for fine grinding of severely abrasive materials up to the hardness of tungsten carbide. The development of the units follows almost two years of consistent research on abrasives in the maker's fine grinding laboratories. Abrasive materials may now be reduced without attritional heat to several microns in diam. without damage to the grinding unit or contamination of the feed.

Three sizes of fluid energy mills—from 4 in. to 15 in. diam.—will be offered for abrasive grinding. Capacities depend upon material and fineness desired. *Sturtevant Mill Co., 102 Clayton St., Boston, Mass.*

Enter 223 on Reader Card

Heavy-duty LP tractor

A COMPACT, very heavy-duty, gas or LP-gas-powered industrial tractor has been developed. Now in national distribution in 3,000, 4,000 and 5,000-lb. drawbar capacity, the new tractors measure 102½ in. in over-all length and have turning radii of 122 in.

A 72-hp., 6-cyl. industrial engine powers the new tractor line. This power is transmitted through a long-life clutch and fluid coupling to a four-speed-forward, syncromesh transmission. Engine and transmission are set in rubber mounts. Normal travel speeds are 13.6 mph. in forward and 1.8 mph. in reverse. *Yale & Towne Mfg. Co., 11000 Roosevelt Rd., Philadelphia 15, Pa.* **Enter 224 on Reader Card**

(Continued on page 172)

***Takes constant pounding day in and day out because it's* FORGED *and* HEAT TREATED**

It's the NEW FORGED "CAPE ANALLOY" DROP BALL

used and praised by quarry operators everywhere

The "Cape Ann" **FORGED** Steel Drop Ball is noted for its long life and better wearing qualities. YOUR secondary breakage problems will be solved when you use a "Cape Ann" **FORGED** Steel Drop Ball. All "Cape Ann" **FORGED** Drop Balls are **SONIC TESTED** before shipment. Fully Guaranteed!

Highly Efficient Secondary Breakage means—More Tonnage—More Profits.

WRITE FOR INFORMATION

CAPE ANN

ANCHOR & FORGE CO.

P.O. BOX 361

GLOUCESTER, MASSACHUSETTS

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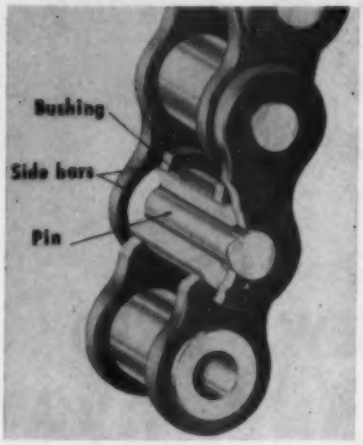
(Continued from page 170)



Self-oiling chain

OIL-IMPREGNATED, sintered-steel bushings are now available in a line of ASA finished steel roller chains. They are said to provide life-time lubrication for this type of chain.

Pressure and heat during operation cause the built-in lubricant to expand and flow from bushings. This provides a constant supply of lubricant to every working part of the chain. When drive stops and the chain cools, the bushings re-absorb oil, assuring a permanent supply of oil for the life of the chain. *Whitney Chain Co., 303 W. Hamilton St., Hartford 2, Conn.*

Enter 225 on Reader Card

Body lock

VIBRATION AND WEAR in dump trailer bodies may now be eliminated with a new locking device suitable for installation on all makes and models. The new Lock-O-Matic solves a problem that has long plagued owners of dump trailers—wear that occurs on the body, the chassis, and in the packing glands of the hydraulic lift itself.

Heavy spring-loaded clamps rigidly secure the body to the frame while the trailer is on the highway. The unit is automatic, self-contained and cannot jam. When the hydraulic system is engaged to start the lift operation, an interim valve activates a clearing control on the mechanism and the clamps are swept free of the trailer body. Actual lifting force cannot be applied until the clamps are cleared. When the body is returned to road position, the clamps are automatically engaged and locked in position, assuring a vibration-free connection between trailer body and chassis. *Trailco Mfg. and Sales Co., Hummels Wharf, Pennsylvania.* **Enter 226 on Reader Card**

Covered gondola

DEVELOPED TO PROVIDE economical bulk transportation for dry materials, this completely welded new car is known as the Dry-Flo car; it can handle a wide range of products where freedom from contamination is necessary.

The design of the unloading gates permits them to be operated with minimum effort, according to the manufacturer. They are not affected by material pressure or rate of flow. The Dry-Flo car is also equipped with permanent pneumatic nozzles and the entire car can be unloaded from one side.

Loading hatches are equipped with rigid, cast aluminum covers and rubber gaskets, providing a completely air-tight seal. *General American Transportation Corp., 135 So. La Salle St., Chicago 90, Ill.* **Enter 227 on Reader Card**

Air cleaner

A DRY-TYPE AIR CLEANER removes 99.8 percent of all dirt from a diesel's intake air. It is fully effective at any engine speed and is designed for speedy servicing. The air cleaner features a multi-cyclone pre-cleaner and disposable resin-impregnated cellulose filter. Dirt is removed from intake air in two stages. Heavier particles are removed by centrifugal force in the pre-cleaner. Finer particles are then trapped by the disposable filter element.

The new unit also eliminates the danger of engine damage resulting from infrequent servicing. When the cellulose filter element becomes plugged the engine will lose power and begin to smoke. This visual warning acts as an automatic reminder that the cleaner must be serviced and offers positive protection against carry-over of dirt into the engine. *Caterpillar Tractor Co., Peoria, Ill.* **Enter 228 on Reader Card**

Low voltage motor control

A COMPLETE NEW LINE of motor controls in the low voltage range of less than 600 v. is now available. The new line is built with three starting options: full voltage, reduced voltage or part winding.

Mechanical features of the new line include formed steel, rigid enclosures. All components are front connected and front accessible with in-channel wiring. Smaller cubicles takes less floor space and are suitable for installation in low ceiling areas and against walls.

The controls are offered in the following protective options of isolating switch only; isolating switch and current limiting fuses; circuit breaker only; and circuit breaker and current limiting fuses. For synchronous motor applications, a new fool-proof, field-failure circuit is provided. *Electric Machinery Mfg. Co., Minneapolis 13, Minnesota.* **Enter 229 on Reader Card**

Tractor roller rebuilding

AN AUTOMATIC DUAL-HEAD roller rebuilder can do as much welding with its eight-spindle setup as three or four operators using single-spindle machines, the manufacturer states. Both sides of the crawler roller are built up simultaneously, and indexing from one roller to the next requires only seconds, so welding is virtually continuous. By the time the first welded roller reaches the eighth index position, this first roller has cooled sufficiently to take the second welding pass, also permitting continuous production.

Another feature is the new Rexarc automatic flux circulating system, which means no handling of flux in keeping hoppers filled. The operator need only empty a bag of flux periodically into the system. *The Sight Feed Generator Co., West Alexandria, Ohio.*

Enter 230 on Reader Card

Multi-purpose lubricant

A MULTI-PURPOSE, premium-quality lubricant, this product has application in 90 percent of all ball and roller bearing installations. It produces superior results in plain bearings, needle bearings and on rotating and sliding surfaces. It is a high-film-strength, lithium-base product with excellent water repellent properties.

Having an operating temperature range of from 0 to 275 deg. F., and a melting point close to 400 deg. F., No. 88 multi-purpose lubricant does not thin out under heat or pressure. It effectively resists the erosive effects of hot water, steam and hot air. It is unaffected by mild acid and alkali solutions. *Keystone Lubricating Co., 3100 North 21st St., Philadelphia 32, Pennsylvania.* **Enter 231 on Reader Card**

Rubber-lined sump pump

VERTICAL SUMP PUMPS are now being produced in capacities from 20 to 1,400 gpm. and in pump sizes from 2x2 to 6x6 in. This newly developed line of pump operates in small spaces on low horsepower without airlocking. *Denver Equipment Co., P. O. Box 5268, Denver 17, Colo.*

Enter 232 on Reader Card END

Which is the Best Screen for your job?

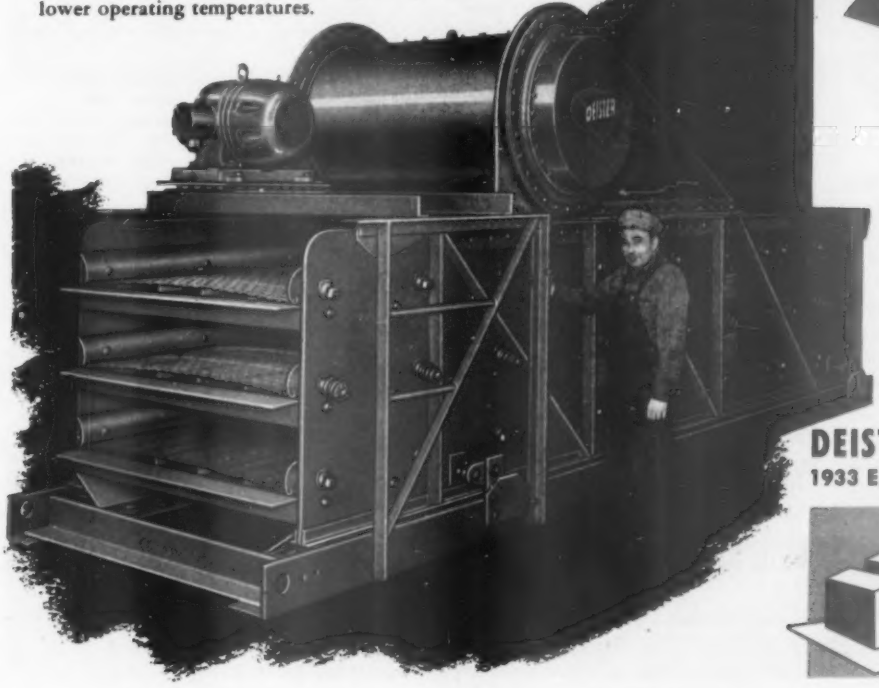
The vibrating screens you select to meet today's extremely competitive conditions must be highly specialized machines . . . designed especially to handle each of *your particular jobs.* And that's why Deister builds screens in four distinct *types* and in a complete range of *sizes.* For example:

Type UHS. Deister Type UHS Screens are built in a full range of sizes to meet any heavy-duty screening job. Extra heavy-duty types are available for scalping and coarse sizing. The Deister principle of opposed elliptical throw provides maximum capacity and efficiency in sizing. With Deister's exclusive Adjustable Slope Screen Panels, the screening angle of every Type UHS may be adjusted exactly at both feed and discharge ends to meet the specific requirements of your job.

Ag-Lime. Deister Ag-Lime Screens (Type USL) are designed to screen damp, sticky material through medium and medium fine screen cloth openings. They apply intense vibration at a relatively high frequency. For unusual conditions they are available with an Electric Screen Heater and a Ball Tray Deck.

Flat Screens (Type UF). If your plant design requires flat or horizontal screens, or if you need increased tonnage but lack the head room necessary to install larger inclined screens, investigate Deister Type UF Screens. They are also unusually effective for dewatering sand, gravel and stone.

An outstanding feature of *all* Deister Vibrating Screens is Deister's Exclusive Oil Mist Lubricating System, permitting operation at higher speeds and lower operating temperatures.



Top: Type UHS Screens are available in 3', 4' and 5' widths; in 10', 12', 14' and 16' lengths; and with single, double or triple decks.

Above: Type USL Ag-Lime Screens are built in 4' x 8' and 4' x 10' single-deck models.

Left: Type UF is built in 3', 4' and 5' widths; in 8', 10', 12', 14', 16' and 18' lengths; in single, double, triple and four-deck models.

DEISTER MACHINE CO.
1933 E. Wayne St., Ft. Wayne, Ind.

DEISTER

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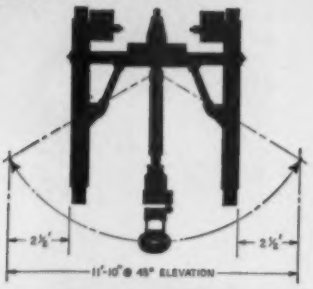
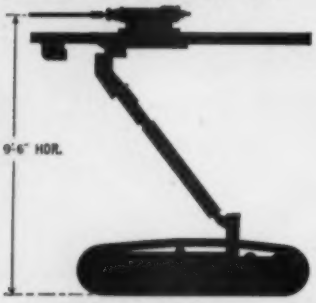
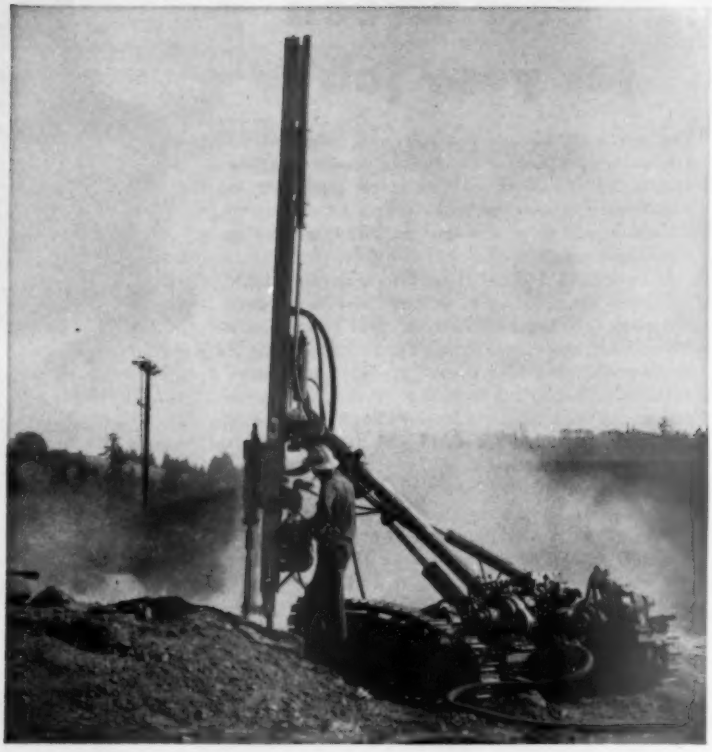
MORE SWING



...MORE REACH



...MORE FOOTAGE



with Gardner-Denver Swing-Boom "Air-Trac"®

TIME TO TALK TIME-SAVING

Gardner-Denver believes there's no substitute for men—it has been our philosophy of growth for 100 years. Your Gardner-Denver construction equipment specialist has helped many uncover ways to speed the pace . . . lower drilling costs. He's a good man to know. Get in touch with him soon.

Swings 11'10" . . . 2½' over both tracks Now drill more hole from one position . . . drill over a ledge from either side. Feed swings 11'10" at 45° elevation . . . moves to 2½' outside of each track with balanced stability.

Reaches to 9'6" height—for horizontal drilling Get better spacing of horizontal holes . . . reach to 9'6" for high breast holes.

Moves quickly . . . safely "Air Trac" is self-equalizing, self-stabilizing, with hydraulic track oscillation. Moves easily, safely over roughest terrain. Designed with an unusually low center of gravity for maximum stability. Long tracks and powerful crawler motors provide plenty of traction. "Air Trac" will pull its own compressor. Tracks available with rubber or steel pads.

Saves time . . . steps All controls conveniently located. Drilling and positioning controls grouped at the front of rig to save steps, setup and drilling time.

Pulls tight steel Powerful Gardner-Denver 5-cylinder radial air motor enables your driller to put the right pressure on the bit in all drilling situations . . . provides necessary pulling power to bring tight steel out of the hole.

Maintains hole alignment Easily handles in-line drilling . . . drilling in fitchery or fractured formations. Creep-free hydraulic boom keeps drill in position . . . track locks keep rig firmly in place in difficult drilling spots.

Drills fast, clean hole Gardner-Denver's line of powerful rock drills is most complete—six hard-hitting models to choose from.

Write for bulletin.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

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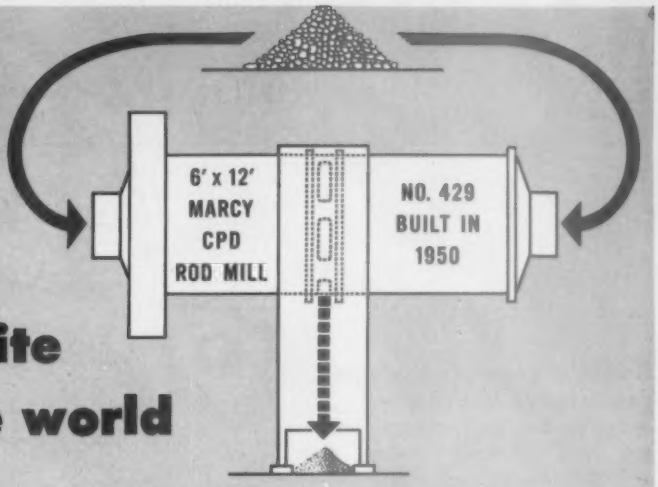
MARCY MILLS

Best by a dam site anywhere in the world



This World Traveler...

Provided Specification Sands for

LOOKOUT POINT DAM, Lowell, Ore., 1950

Photo courtesy Corps of Engineers, U. S. Army

Constructed and operated by the Corps of Engineers, U. S. Army, Portland District, for flood control and power. This earth and concrete dam, and the Dexter Dam, a reregulating unit, required 996,000 cu. yds. of concrete. Contractors were Morrison-Knudsen, Peter Kiewit Sons Co., and Macco Corporation.

Provided Specification Sands for

TABLE ROCK DAM, Branson, Mo., 1954

Photo courtesy Corps of Engineers, U. S. Army

Constructed and operated by the Corps of Engineers, U. S. Army, Little Rock District, for flood control and power. 1,300,000 cu. yds. of concrete were involved on this earth-concrete structure. Morrison-Knudsen Co., Inc., and Utah Construction Co. were the contractors.

Will Provide Specification Sands for

KARADJ DAM, Teheran, Iran, 1958

Scheduled for completion in 1961 this dam will be 590 ft. high, one of the ten highest concrete dams in the world, and will require 915,000 cu. yds. of concrete. It will be a source of city water supply, power and irrigation. Harza Engineering Co. International prepared plans and specifications. Morrison-Knudsen Co., Inc., was awarded the contract by Iran. An 8' x 12' Marcy CPD Rod Mill is also on order for this project.

Morrison-Knudsen purchased this 6' x 12' Marcy CPD Rod Mill in 1950 for use in producing specification sands for the Lookout Point Dam; moved it to their job on the Table Rock Dam; and will use it, along with an 8' x 12' Marcy CPD Rod Mill, on Iran's Karadj Dam.

On important projects,

throughout the world, where sand specifications are rigid, you'll find Marcy CPD Rod Mills.

See what Marcy can do for you...CALL, WRITE or WIRE

Manufacturing Division

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Enter 1249 on Reader Card

MANUFACTURERS NEWS

Doctor of engineering degree conferred on V. P. Reilly

THE TRUSTEES AND FACULTY of Purdue University, Lafayette, Ind., have conferred the degree of Doctor of Engineering honoris causa on Mr. Vincent P. Reilly of River Forest, Ill. Mr. Reilly is the founder and president of the Illinois Gear & Machine Co., of Chicago.

WEMCO general sales dept.

TO KEEP PACE with recent expansion and product diversification, WEMCO, a Division of Western Machinery Co., San Francisco, Calif., has made the following changes in its general sales department.

F. Victor Schneider becomes field sales manager; Douglas E. Newton will be headquarters sales manager; William H. Reck will continue in his position of consulting metallurgical engineer, specializing in flotation problems. Donald W. Jenkinson has been appointed consulting metallurgical engineer, handling gravity concentration problems, and Charles E. Golson has been named manager of sales development in the aggregate industry. Harold K. Cogswell remains eastern regional sales manager; Gordom E. Cofield has been named to the newly created post of midwest district sales manager; David L. Springston has been named manager of coal sales, and Joseph J. Davey has been appointed manager of torque-flow pump sales.

Jacobson named sales manager

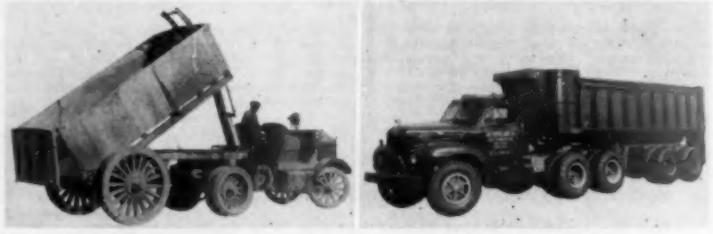
A. T. JACOBSON has been appointed sales manager of The Patterson Foundry and Machine Co., East Liverpool, Ohio. Mr. Jacobson joined the company in 1948; he was appointed district manager of the Detroit office, a position he has held until his present appointment.

Bucyrus-Erie acquires giant Kolbe wheel excavator

BUCYRUS-ERIE CO. has acquired the plans and patents for the Kolbe wheel excavator, claimed to be the largest earthmoving machine ever built in America. The announcement was made at the first public demonstration of the machine at the United Electric Coal Co.'s Cuba Mine near Canton, Illinois.

William L. Litle, board chairman of Bucyrus Erie, told the gathering of more than 200 industrialists that Frank F. Kolbe, president of United Electric, pioneered the use of wheel excavators in this country.

The machine shown at the demonstration is 46 ft. wide, 150 ft. high and weighs 2,100 tons.



100 years of service—from carriages to dump bodies

JACOB PRESS' SONS, INC., Chicago, Ill., is celebrating 100 years in building commercial truck bodies. Henerich Jacob Press I came to Chicago from Germany in 1854, and in 1859 formed a partnership with his brother-in-law under the name of Kuhl and Press. They produced some of Chicago's most elegant carriages of the Gaslight era.

In 1869 the firm became known as Jacob Press, employing ten men. In the early 1900's the company became pioneers in the construction of some of the first automobile bodies, and in 1911 the company built semi-trailers and semi-dump trailers. They also held the first patent on pivot based hoists.

Today, known as the Jacob Press' Sons, Inc., the company produces trailer dump bodies, dump bodies, stake bodies, sliding 5th wheels, railroad detector cars and numerous types of other bodies.

(Continued on page 180)

Enter 1241 on Reader Card

Only BAGPAKS® have a built-in insurance policy backed by International Paper

ACCIDENTS like this *will* happen. That's why International Paper plans for extraordinary stresses and strains when designing its Bagpak multiwall bags.

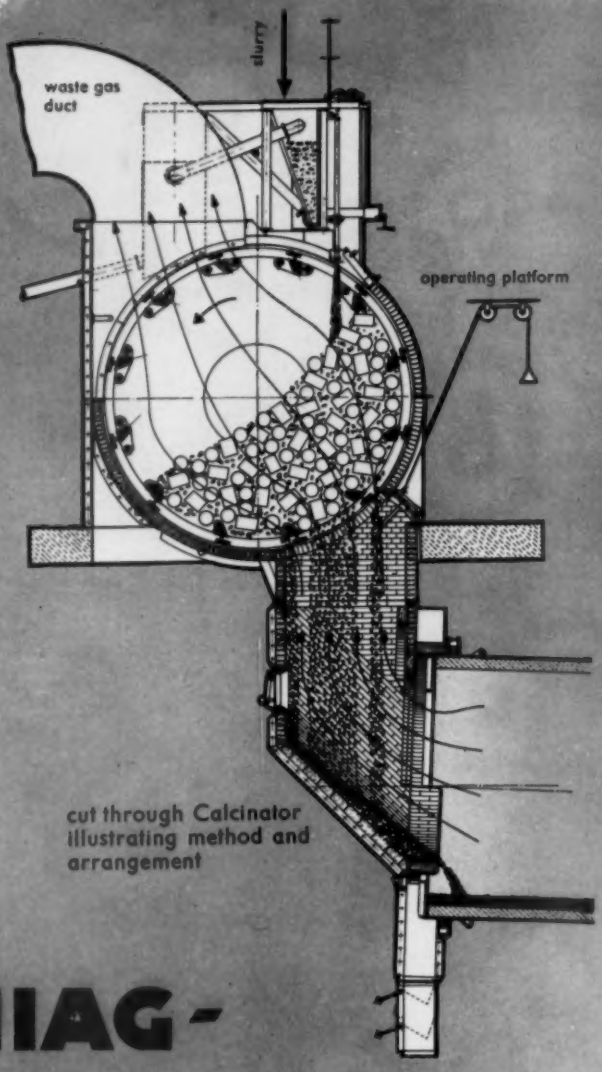
Only genuine *Gator Hide*® kraft, famous for toughness, is ever used in making Bagpak multiwalls. Quality is controlled every step of the way. International Paper can do this because it grows its own trees, makes its own paper, converts it into printed multiwall bags to your order. It also designs and builds *Bagpaker*® machines that can package up to 60 tons of material per hour!

When you buy Bagpak multiwall bags you get speedy shipments geared to your production schedules. *Twenty-one* sales offices and four strategically-located plants save you money by keeping your inventory at a minimum.

Only Bagpak multiwalls are backed by the full resources of International Paper—world's foremost pulp, paper and paperboard producer.

Next time your Bagpak field service engineer drops by, ask him what's new. He knows.

Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.



cut through Calcinator illustrating method and arrangement

Calcinator Installation for 7200 bbl/day

Calcinator for a wet process 3600 bbl kiln pre-assembled in factory

Grate drum of Calcinator for 3600 bbl capacity being assembled

MIAG-CALCINATOR

the pre-heater for wet process kilns reduces fuel consumption, increases capacity

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SYNTRON Vibra-Flow VIBRATORY FEEDERS

for dependable, controlled high rate feeding of rock, aggregate and sand at low cost

SYNTRON Vibratory Feeders will feed rock, aggregate, sand and other bulk materials efficiently and economically at rates from pounds to thousands of tons per hour.

SYNTRON Vibratory Feeders give you features essential to high production at lower cost.

—dependable, even flow feeding, electromagnetic drive producing 3600 powerful vibrations per minute, move even the most stubborn hard-to-handle material.

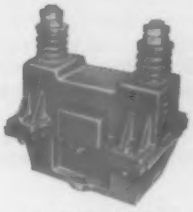
—flow control is easy. A turn of the rheostat knob provides instant control of vibration for maximum to minimum material flow.

—durable and versatile. Withstand heavy load shock and wear by abrasion. Compact, easily integrated into continuous operations.

—operation and maintenance economy. SYNTRON Feeders contains no mechanical wearing parts—require no lubrication or periodic adjustment.

For dependable, low cost handling of your bulk materials problems, large or small write for information on SYNTRON Electromagnetic Vibratory Feeders.

Other SYNTRON Equipment of proven dependable Quality



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VIBRATING SCREENS

GRAVIMETRIC FEEDERS

DRY FEEDER MACHINES

TEST SIEVE SHAKERS

SYNTRON COMPANY
450 Lexington Ave. Homer City, Penna.

Enter 1299 on Reader Card

(Continued from page 176)

Caterpillar outlook encouraging

CATERPILLAR TRACTOR CO., San Francisco, Calif., said that prospects for the rest of 1959 are very encouraging, particularly if a steel strike of considerable length can be avoided this year. The company has anticipated the possibility of such a strike and could withstand one without too much difficulty if it were not long extended. In the first two months this year, Caterpillar had earnings equal to 61 cents a common share, against 16 cents a share in the like 1958 period.

McGuire named manager

L. T. MCGUIRE has been appointed manager of dealer sales operations for the Western Machinery Co. Mr. McGuire will be in charge of all phases of distribution for farm, automotive and specialty equipment in the intermountain and southwest trade areas.

The position of operations manager for construction and industrial equipment sales in Salt Lake City, Utah, will be filled by Nicholas Economou, who is being transferred from Western Machinery's San Francisco office.

Clark Equipment sets up hydraulic systems unit

CLARK EQUIPMENT CO., Battle Creek, Mich., has organized a new division to supply hydraulic systems for the company's line of materials handling equipment as well as to other manufacturers. Headquartered in Benton Harbor, Mich., the division is producing hydraulic pumps and motors, with a line of valves and other related products scheduled to be introduced shortly.

Addition to diesel plant

DETROIT DIESEL ENGINE Division, GM Diesel, Detroit 28, Mich., has added a new test room which was part of a 300,000 sq. ft. addition to the division's plant. With up to 70 dynamometer stands now available for use, GM Diesel's test facilities are second to none in the Diesel engine industry. Further modernization included the installation of five new assembly lines, additional shipping facilities and space for testing multiple and other specially built-up engines. Simultaneously, GM announced the addition of eight new "V" and "in-line" engines, extending its range of single and multiple units from 20 to 1650 hp.

Colorado district manager

A. E. STEPHENS has been appointed district manager for Colorado, covering the entire state and the southern half of Wyoming for the Richardson Scale Co., Clifton, N.J.

Mr. Stephens has been with the company for a number of years in a sales and service capacity at Wichita and is now covering the new territory which was formerly covered by an agency arrangement which concluded.

Raymond bag division receives special safety award

THE MANUFACTURING PLANT of the Raymond Bag Corp., Middletown, Ohio, has received a special safety award for compiling a man-hour safety record which is less than one-third the average for the over-all bag industry. Raymond compiled a total of 723,676 man-hours with only two disabling injuries which resulted in 34 days lost time. The accident frequency rate was 2.76 days per million man-hours worked.

C. H. Robertson (second from left), vice president of the Albemarle Paper Mfg. Co., presented a bronze plaque to J. R. Clements (center), Raymond president, for having the best safety record.

(Continued on page 182)

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GROUT HOLE DRILLING

Skilled crews and complete stock of core drills and accessory equipment maintained at all times

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Denver, Colo., U.S.A.

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WILFLEY centrifugal PUMPS

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NEW THERM-O-FLEX COLLECTOR

CLEANS GASES TO 550°F

with VIRTUALLY 100% COLLECTION!

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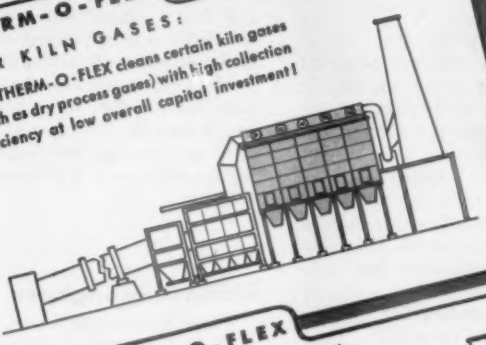

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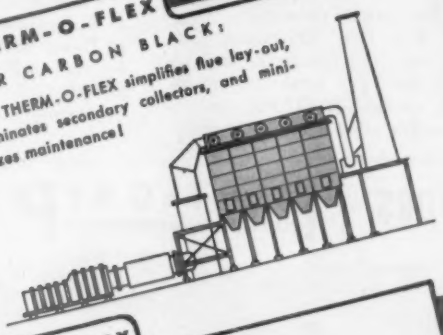
The THERM-O-FLEX simplifies flue lay-out, eliminates secondary collectors, and minimizes maintenance!



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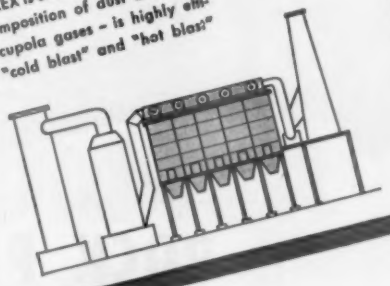
FOR CUPOLA GASES:

The THERM-O-FLEX is unaffected by the varying chemical composition of dust and fume particles from cupola gases – is highly efficient on both "cold blast" and "hot blast" processes!



Western-Precipitation brings another important new advancement to the gas cleaning field — the THERM-O-FLEX Collector — a filter type of unit with many advantages over conventional filter equipment...

- The THERM-O-FLEX features glass silicone treated filter tubes that efficiently handle gases as hot as 550° F!
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RESULT —
highest collection efficiency combined with lower cost, less maintenance and uniformly low pressure drop on a wide range of applications, a few of which are shown at left.

Let Our Experienced Engineers study your dust or fume collection problem — *large or small* — and show exactly how THERM-O-FLEX gives new standards of performance at low installation costs. No obligation, of course!

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describes multiple Therm-O-Flex savings, outlines applications, technical data. *Ask for Bulletin #F105!*

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(Continued from page 180)

Companies reveal profits

HARNISCHFEGER CORP., Milwaukee, has declared a dividend of forty cents per share on common stock payable July 1, 1959, to stockholders on record as of June 19, 1959.

The Dayton Rubber Co., Dayton, O., revealed sales for the six months ending April 30, 1959—the first half of the fiscal year—established a new record. Sales amounted to $43,268,926, an increase of 13 percent from a year earlier.

Minneapolis-Moline Co., Hopkins, Minn., has first-half profits for first time in six years. Their net profit of $1,413,000 in the six months ending May 1, 1959, contrasted with a net loss of $1,414,000 in the first half of the previous year. The net profit was equivalent to $1.45 per common share after providing $84,000 for preferred dividends.

Clark Equipment Co., Battle Creek, Mich., announced their first-half sales "conceivably may reach $100 million." Mr. George Spatta, president, said earnings are "hard to estimate" but would surely be "better than the first half of 1957."

Massey-Ferguson, Ltd., Toronto, announced net earnings were up sharply in the first six months of fiscal 1959 over the like period in 1958.

Caterpillar Tractor Co., Peoria, Ill., announced sales in the three months ending June 30 will set a new quarterly record for the company.

Harbison-Walker Refractories Co., Pittsburgh, announced that barring a steel strike, the company is expected to have a "very good year." Orders received in the first quarter of 1959 were 58 percent higher than in the same period of 1958.

General Refractories Co., Philadelphia, announced earnings increased more than five-fold in the first quarter while sales jumped more than 50 percent, compared with the corresponding quarter of 1958.

Bucyrus-Erie Co., South Milwaukee, earned $95,939 in the first quarter of 1959, compared with a loss of $653,926 a year ago. Mr. R. G. Allen, president, told stockholders that earnings for the second quarter were expected to be substantially greater than the first quarter showing.

Chain Belt Co., Milwaukee, announced that sales during the first six months of the 1959 fiscal year ending April 30, totaled $31,937,902—a record six-month sales figure; this represents a 17.1 percent increase over sales during the comparable 1958 period.

Chrysler appointments

THE CHRYSLER CORP., Marine and Industrial Engine Div., Detroit, Mich., has announced the appointment of O. H. Vandeputte as manager, marketing staff, and L. A. Peaslee as industrial engine sales manager.

Mr. Vandeputte joined Chrysler in 1955 when he was selected for a special dealer organization study group, and later was appointed to the staff of the director of marketing.

Mr. Peaslee has been with the company for the past three years, during which time he has been supervisor of sales engineering and sales engineer for the Marine and Industrial Engine Division.

Slohm sales engineer

FIRST MACHINERY CORP., Brooklyn, N.Y., has announced the appointment of David Slohm to the sales engineering staff of First Machinery and of the subsidiary company, the Falcon Manufacturing Division.

(Continued on page 184)

Light TROUGH-BELT CONVEYORS

Elevates: Sand • Gravel • Dirt • Cement
Quartzite • Taconite • Slag • Fertilizer
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TR Series conveyor without undercarriage for permanent or semi-permanent installations.

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MINERALS INDUSTRY

DRILL BLAST HOLES

* 2 TO 5 TIMES FASTER
* ONE OPERATOR
* ONE MACHINE

BLASTHOLER drilling 25′ blast holes 3″ in diameter in limestone quarry. Production averages 1200′ per day.

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A self-propelled rotary drill, the BLASTHOLER is mounted on tracks or dual pneumatic tires — covers terrain like a bulldozer. The BLASTHOLER requires only one operator — carries its own air for cleaning blast hole. In limestone quarries meeting highway specifications, the average time for 20′ holes is 3 to 4 minutes. Many BLASTHOLERS have drilled more than a million feet within a 2-year period. Chances are the BLASTHOLER can improve your production record and save you money, too! *Contact your nearest dealer for a cost-cutting demonstration today!*

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DRILLING ACCESSORY AND MANUFACTURING COMPANY, INC.
2006 South Industrial Boulevard
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(Continued from page 182)

Herbst named manager

R. G. HERBST (right) has been appointed general sales manager of "Quick-Way" Truck Shovel Co., Denver, following the resignation of T. S. Petersen. Mr. Herbst has been with Quick-Way 28 years, in manufacturing, engineering, testing, field service and sales.

Shew named sales manager

FREDERICK B. SHEW has been named manager of sales, commercial cranes and excavators by Bucyrus-Erie Co., South Milwaukee, Wis. Mr. Shew had been sales development manager, commercial cranes and excavators, for the last three months. He joined the company in 1956 as a sales representative.

Also, Bucyrus-Erie's Drill Division at Richmond, Ind., has been named one of the nation's top 10 plants built in 1958. The facility was selected from more than 700 entries in the 25th annual "Top Plants" competition conducted by Factory magazine.

A-C aggregate crushing plant

A NEW ALLIS-CHALMERS, Milwaukee, Wis., aggregate crushing plant will help speed the construction of a large federal hydro-electric power plant on the Rio Grande river in the state of Minas Gerais, Brazil. Engineered and coordinated by A-C International, the crushing plant order had an extremely short delivery time of only two and a half months.

Equipment furnished by A-C includes three crushers, a 48 x 36 jaw crusher, a 1051 Hydrocone and a 3½51 Hydrocone; two 5 x 12 Ripl-Flo vibrating screens; a 48-in. x 14-ft. apron feeder; conveyors ranging in width from 24 in. to 30 in.; two 150-hp. and one 100-hp. wound rotor crusher motors; two 7½-hp. motors for the screens; 13 motors ranging from 5 to 25 hp. for the conveyors; one 10-hp. apron feeder motor; and controls. All crushing plant equipment will be supplied by Canadian Allis-Chalmers, Ltd.

Heuser appointed president of Atlas Copco in U.S.

ATLAS COPCO A.B. of Stockholm, Sweden, has announced the appointment of Jack E. Heuser as president of their two U.S. companies, Atlas Copco Pacific, Inc. and Atlas Copco Eastern, Inc. Mr. Heuser will be responsible for coordinating Atlas Copco operations in the U.S.

Trend to planetary axles

CRANE CARRIER CORP. (Tulsa, Toronto and Rotterdam, Holland) has just completed its 500th vehicle equipped with planetary axles. Crane Carrier, a pioneer in assembly-line production of custom chassis for off-the-road equipment, uses planetary axles made by the Automotive Division of Clark Equipment Co., throughout its line of 25-ton to 80-ton vehicles. END

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___Tractor Shovels
___Tractors
___Trailer Dump Bodies
___Trucks, Bulk Cement
___Trucks, Industrial
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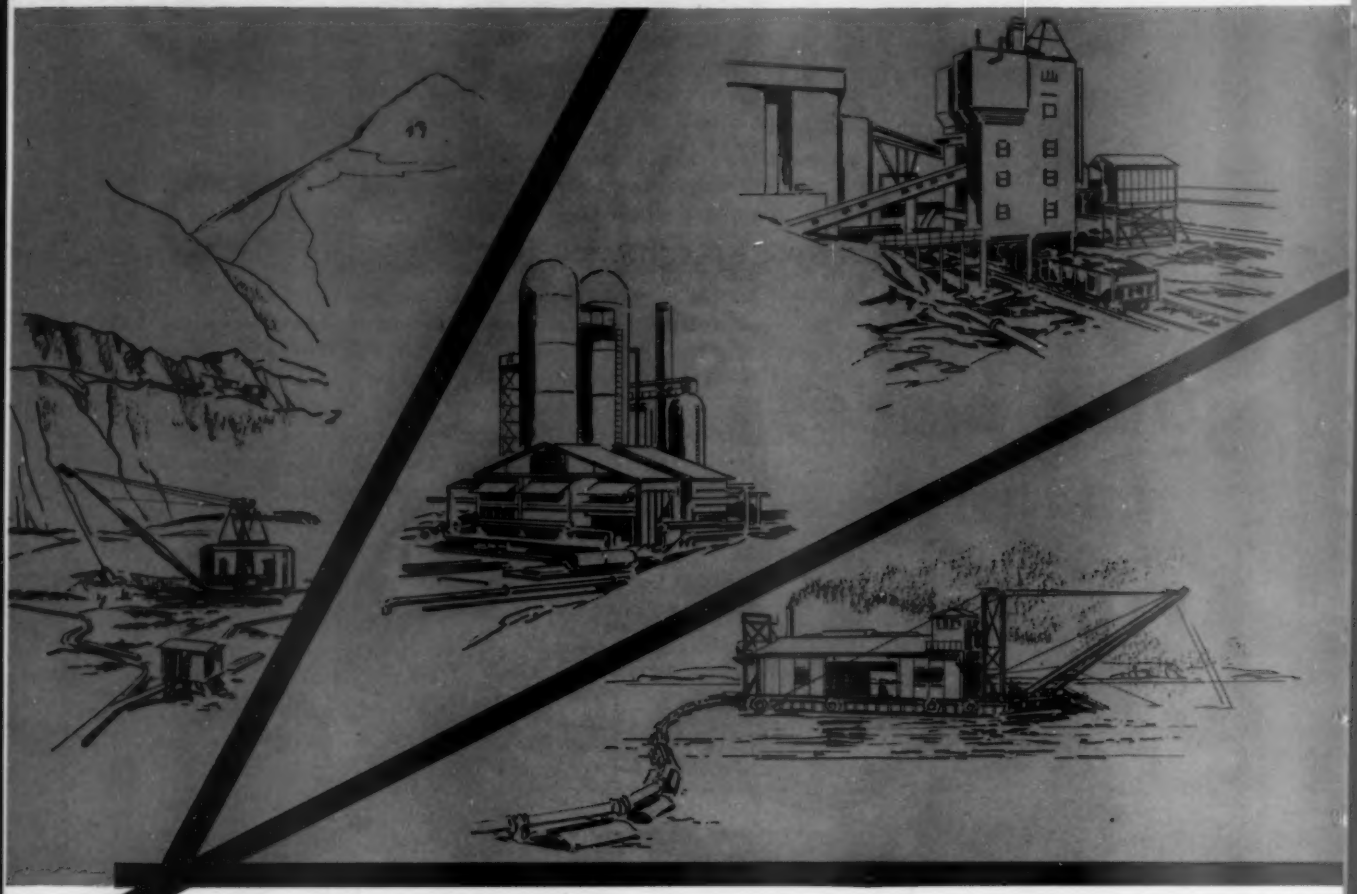

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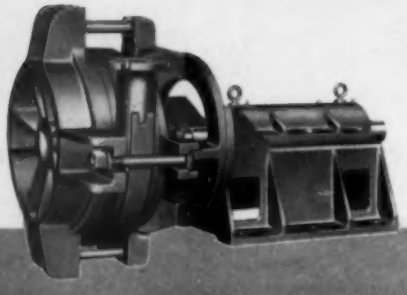

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KILNS—DRYERS—CRUSHERS
R. C. STANHOPE, INC.
60 E. 42nd St., N.Y. 17, N.Y.
TEL. MU 2-3076 & 2-1898

SPECIALS

#1, #0 & 5—Roll Raymond Mills
6'-5"x100' & 6'x120' Kilns
Complete Lime Hydrating plants.

CRUSHERS

1—48" x 60", 42" x 40", 30" x 36", 24" x 36", 18" x 36", 15" x 30", 12" x 24" Jaw Crushers.
2—42" x 16" Allis-Chalmers Crushing Rolls, rebuilt. 36" x 16 rebuilt Sturtevant rolls.
1—6", 10", 16", 20" McCully Superior Gyratory Crushers.
No. 3 up to No. 12 Gyratory Crushers.

BALL & TUBE MILLS

5'x22', 6'x22', 7'x24'

DRYERS

8½'x65' & 8'x60

W. P. HEINEKEN, INC.
80 Broad St., N.Y. Tel. Wh. 4-4236

QUARRY EQUIPMENT

Cedarapids Jr. tandem crushing plant, 1036 jaw.
Cedarapids 1236 twin jaw crusher.
Cedarapids 6C, 1236 twin jaw portable secondary.
Cedarapids 1216 twin jaw crusher.
Cedarapids model 1 Kubit impact breaker.
Cedarapids 2033 hammermill. Slightly used.
Williams No. 40 Slugger Type Pulverizer.
Cedarapids 4' x 14' 2-deck screen. New warranty.
Cedarapids 4' x 12' 3-deck screen. New warranty.
Robins 4' x 9' triple deck screen.
Pioneer 4' x 8' double deck screen. Rebuilt.
Kennedy Van Saun 3'x8', 3-deck screen. New condition.
Cedarapids 30-S, 2-compartment charging hopper, apron feeder, bucket elevator. New. 27½ ton, single-compartment 8' x 12' bin.
1—Eagle 36"x20' double log washer. Good.
McLanahan & Stone 8'x30' double log washer.
60-ton, two-compartment, 8' x 18' storage bin with clam gates.
100-ton, two-compartment, 13' x 23' bin.
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also conv. belting.

SHOVELS AND CRANES

P&H 855B-LC 3-yd. diesel dragline.
Lorain L-820, 2-yd. Diesel Dragline.
Lorain L-36, ¾-yd. diesel dragline. Excellent.
Lorain TL-30, ¾-yd. diesel basic machine.
Lima 34 Paymaster ⅝-yd. diesel shovel. Good.
Unit 1020 ⅝-yd. diesel powered shovel.
Koehring 304, ⅜-yd. diesel shovel-backhoe.
P&H 255A, ⅜-yd. diesel crane.
Unit 614, ½-yd. diesel backhoe. Good.
Bucyrus-Erie 102B, ⅜-yd. gas shovel-backhoe.
Bucyrus-Erie 101B, ⅜-yd. Gas Shovel.
American 100, ½-yd. gas clam-backhoe.
Lorain MC-414, 20-ton Moto-Crane, Reconditioned.
Link Belt HC-90, 25-ton truck crane.
Michigan TLDT-30, 30-ton truck crane.
Lorain MC-110, 10-ton gas Moto-Crane.
Lorain MC-4 15-ton gas Moto-Crane.
Lorain SP-107, 7-ton, self-propelled Crane.

TRACTORS, TRUCKS, SCRAPERS, ETC.

1—Euclid TS-18, 18-yd. twin engine scraper.
3—Euclid 12-yd. overhung engine scrapers.
1—Euclid 7-yd. overhung engine scraper.
1—Euclid 15½-yd. six wheel scraper.
2—Euclid 13-yd. bottom dumps. Good.
2—Euclid 44TD, 22-ton rear dumps.
2—Euclid 60FD, 15-ton rear dumps.
1—Euclid TC-12, twin engine tractor.
3—Allis Chalmers TS-300 15-yd. overhung engine scrapers.
1—International TD-18 with cable bulldoser blade.
1—Caterpillar D-7 with bulldozer, crane boom.
1—Caterpillar D-7 with hydraulic angle dozer blade.
1—Caterpillar D-8 with push block.
1—Caterpillar D-4 TRACTOR ONLY.
1—International 300 tractor, with loader, backhoe.
1—Allis Chalmers HD-19 with cable bulldoser.
1—Caterpillar 12 diesel grader.
1—LeTourneau Super C Tournadozer. Excellent.

SHOVEL ATTACHMENTS

Lorain 82 or 820, 2-yd. 23' boom, 20' stick.
Osgood 993, 3-yd., 24' boom, 20'6" stick.
Lorain 36, ¾-yd., 19' boom, 16' stick.

BACKHOE ATTACHMENTS

Lorain 56, 33' boom, 7' stick, 48" bucket.
Lorain 72, 25' boom, 9' stick, 84" bucket.

GENERATOR SETS

Universal 5KW, D.C., 1200 RPM, 230-250 volts.
Century-Waukesha 15 KW, 1200 RPM, 3/60/127-220.
Century-Continental 15 KW, 1200 RPM, 3/60/120-208.
Cummins 25 KW, 1200 RPM, 3/60/120-208.
Caterpillar 40 KW, 1200 RPM, 3/60/220/440.

DIESEL POWER UNITS

Cat. D7700, 74 H.P. at 1000 PFM. Rebuilt.
Cat. D13000, 138 H.P. at 1000 RPM. Rebuilt.
GM 3021C, 3-cylinder, new.
GM 671, 6-cylinder. Rebuilt.
GM twin diesel. Rebuilt.

AIR COMPRESSORS

105 cu. ft. Leroi Tractair with dozer, backhoe.
2—105 cu. ft. Ingersoll Rand gas portables.
2—125 cu. ft. Gardner-Denver gas portables.
125 cu. ft. Jaeger gas portable.
160 cu. ft. Worthington gas portable.
210 cu. ft. Gardner-Denver diesel portable.
315 cu. ft. Schramm gas portable.
600 cu. ft. Ingersoll-Rand, Waukesha power.

L. B. SMITH, INC.

Camp Hill, Pa.

Phone Harrisburg REgent 7-3431

FOR SALE

GRAVEL PLANT EQUIPT.

1 3'x10' Seco Screen. 3 Deck, Model 7319, Type S, Complete with 10 HP Motor, Drive, Support Tower, and Misc. Chuting and Hoppers. Condition: Like New. Price $3000.
1 3x6 Austin & Weston Apron Feeder, Model 86, with Disengaging Clutch Assembly. Price: $4000.
1 8'x18' Howe Platform Truck Scale, Equipped with Model 1700 Weight-O-Graph. Price: $500.
1 Eagle Rock Crusher, 12" x 24". Speed: 1200 RPM. Price: $300.

CONCRETE PLANT EQUIPT.

1 1600 Bbl. Heltzel Cement Plant, Complete with Bin Valves, Batcher, and Scales. Dismantled. Good Condition. Price: $4000.
1 600 Bbl. Heltzel Cement Plant. As Above. Price: $3000.
1 150 Gal. Water Batcher. Blaw Knox. Complete with Scales. Over and Under Indicator. 2" Rotary Inlet Valve. 4" Rotary Discharge Valve. Good Condition. Price: $500.
1 1½ Yd. Johnson Agg. Batcher, Model 16B, Complete with 3 Compartment Bin Bottom, 3 Quadrant Gates, Scale Beams, Levers, & Beam Box. Good Condition. Price: $1000.
2 Gruendler Belt Elevators. One 52' Centers. One 58' Centers. Complete with Drive Belts, No. 5 American Speed Reducer, 20 HP Motors, 26" Belt, 24" Material Buckets. Rated Cap. 100 TPH. Condition Good. Price: $2000.
1 26"x8 Ply Elevator Belt. 136' Long (New) 36 oz. For Above Elevators. Price: $1000.
1 Lot of New 26" Elevator Belt. 8 Ply. 36 oz. Various Lengths. 20'—40'. Price: $5.00 per Ft.
1 Lot of Used 26" Elevator Belt. 8 Ply. 36 oz. Various Lengths. Price: $2.50 per Ft. Also Misc. Repair Parts for 26" Gruendler Elevators. Gears, Bearings, Shafts & Etc. New and Rebuilt. Reasonable.
1 Material Elevator, Cement or agg. Enclosed. Complete with 7½ HP Motor, Speed Reducer, Chain, & Buckets. 50' Centers. Rated 50 TPH. Good Condition. Price: $1500.
1 Material Elevator, Cement or Agg. Enclosed. With Boot Drive & Speed Reducer. No Motor or Chain. 58' Centers. Good Condition. Price: $600.
1 Godfrey Skip Hoist. Winch Model FSJ1. Complete less Motor. Excellent Condition. Price: $200.
1 Godfrey Skip Hoist Bucket. 1 Ton Cap. Complete with Wheels, Shafts, Bearings, Bail & Block (New). Price: $400.
1 320', ½"—6x19 Hem Center Wire Rope (New). Price: $40.00.
1 Jeffrey Car Puller. Rated Cap. 5000 Lb. Rope Speed: 45 FPM. Good Condition. Price: $300.
2 12"x18" Clam Type Blaw Knox Bin Gates. 1 New. 1 Rebuilt. Price: $100.00 Each.
1 Lot Automatic Material Handling & Flow Control Equip. for Concrete Plant. Includes Control Panel, Air Rams, Solenoid, Micro Switches, & Hi-Low Bindicators. Complete (New). Price: $1000.
1 Lot 18" Elevator Belt. 8 Ply. Various Lengths. 15'—60'. New & Used. Reasonable.
1 Used Gilson Laboratory Analysis Screen. Good Condition. Price: $150.
1 American Marsh Split Cage Centrifugal Pump. 300 GPM. Complete with 20 HP, 220-440V Motor. Good Condition. Price: $250.
1 Durro Piston Type 2" Shallow Well Pump. Complete with 3 HP Motor & Drive. Good Condition. Price: $150.
1 4" 2-Stage Turbine Pump. Complete with Surface Discharge Head & Motor. Cond. Good. $150.
1 Fairbanks-Morse 2"x1½" Builtogether Pump with 10 HP, 3450 RPM Motor. Cond. Good. $100.
1 Link Belt Speed Reducer. Size D9-RH. Good Cond. Price: $300.
1 GE 100 HP 220V Automatic Motor Starter. Price $100.
1 A.B. 100 HP 220V Reduce Voltage Manual Starter. Good Cond. Price: $200.
1 100 HP GE Motor. Type 1E13A. Slip Ring. 440V. 1750 RPM. Open. Good Cond. Price: $750.
1 100 HP A.C. Motor. Modified Slip Ring Type. 220V. 580 RPM. Fair Cond. Price: $750.
1 100 HP A.C. Motor. Modified Slip Ring Type. 220 V. 580 RPM. Fair Cond. Price: $300.
20 Electric Motors from 2 to 30 HP. Most are Dual Voltage. Some Gearhead. Various Speeds. Price: $25.00 and Up.

Detailed List of Motors & Automatic Equipment Available Upon Request.

Write or Phone:
Chas. W. Williams—MOntana-1-2711
or Ed Pitzer—BLackburn-1-1800
HILLTOP CONCRETE CORP.
Box 56, Westwood Sta.
Cincinnati 11, Ohio.

LARGEST SELECTION

ROTARY KILNS—DRYERS—COOLERS

1—Traylor 11' x 155' Rotary Kiln, ⅞" shell.
1—Allis Chalmers 9' x 130' Rotary Kiln, ⅝" shell.
1—Vulcan 8' x 87', ½" shell.
3—Louisville 8' x 50', ⅝" steel shell with 1/4" stainless steel lining.
2—Vulcan 7' x 80', ½" shell.
2—Vulcan 7' x 55', ⅝" shell.
2—Link Belt Roto Louvre Dryers, 6'4" x 24'
1—Rennenberg 6' x 50', ⅜" shell.
1—Rennenberg 5'6" x 50', ⅜" shell.
1—Ruggles Cole 5' x 30', class A-8, Indirect Heat Dryer, ⅜" shell.
1—Allis Chalmers 4' x 40'.
1—Allis Chalmers 4' x 30', ⅜" shell.
1—34" x 30', 1/4" shell.
1—Traylor 30" x 18', 1/4" shell, 430 S.S.

MILLS—CRUSHERS—PULVERIZERS

2—Traylor Compeb Mill 7' x 27' with 1—500 HP & 1—600 HP motor 3/60/440.
1—Williams Hammermill, 300 HP.
1—Allis Chalmers 6' x 22' Tube Mill, 250 HP.
1—Smidth 6' x 20' Tube Mill, 300 HP.
1—Smidth 5'6" x 21' Tube Mill.
1—Hardinge 4½' x 24" Steel Conical Mill.
1—Denver 3' x 5' Continuous Ball Mill
1—Telsmith Reduction Crusher No. 46, 50 HP.
2—Kennedy #6 Gyratory Crushers, 50 HP.
5—Jaw Crushers 12" x 18" to 36" x 48".
1—Penn. Non-Clog Swing Hammermill, size 5060, 47" x 60" cap. 200—275 tons per hour, requires 400 HP motor UNUSED.
1—Penn. Super-Thor Hammermill, size SXT13, 250 HP.
5—Raymond Bowl Mills, Two Roll, 60 HP.
3—Bradley 6' Hercules Mills, 300 HP.
3—Raymond 5 Roll Low Side Mills.

AIR SEPARATORS—SCREENS

1—18' dia. Raymond Double Whizzer Separator with 100 HP motor.
1—14' dia. Raymond Double Whizzer Separator with 60 HP motor.
1—Gayco 8' dia. mechanical Air Separator.
1—Raymond 30" dia. Whizzer Separator.
1—Dracco Dust Collecting System type DAAA-3 with Dracco Perfecto Filter #19 Clarage exhaust fan 2000 cfm, 10 HP motor.
1—Tyler Hummer Screen 4' x 10' type 38 with V-52 Vibrators and Thermionic unit.

ELEVATORS—CONVEYORS

14—Link Belt chain Elevators 22' to 60' high.
1—24" Troughing Belt Conveyor 75', 7½ HP.
1—Robins 84" x 22' Feeder Conveyor, 15 HP.
1—Robins 24" x 14' Belt Conveyor, 3 HP.
1—Robins 18" x 30' Troughing Conveyor.
1—Fuller-Kinyon Conveying System type H257, 100 HP.
2—Fuller-Kinyon Conveying Systems type 10B-No. R, 75 HP.

For inquiries on Boilers, Diesel Generator Sets, Turbo Generator Sets, Steam Engines, write to our Department P-1.

BRILL EQUIPMENT COMPANY

2401 Third Avenue, New York 51, N.Y.

Tel: CYpress 2-5703

RAILS—All Sections
NEW RELAYING—All Accessories
TRACK EQUIPMENT, FROGS—CROSSINGS—TIE PLATES, CONTRACTORS AND MINE & MINING MACHINERY CARS

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BONDED QUALITY BARGAINS

CURRENT MODELS - IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES

BONDED® TROUGHING IDLER CONVEYOR BARGAINS

CONVEYOR PRICES INCLUDE BELTING

Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams, with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2 1/4" or 2 7/16" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1138.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1189 AND PRICES.**

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Ft.
14"	25'	$1397	$ 738	
14"	50'	2222	1159	$16.84
14"	85'	3377	1748	
16"	20'	1262	667	
16"	45'	2137	1118	
16"	60'	2662	1388	18.04
16"	90'	3712	1930	
18"	25'	1477	797	
18"	45'	2217	1182	
18"	70'	3142	1663	
18"	85'	3697	1952	19.34
18"	100'	4252	2240	
18"	130'	5362	2817	
20"	25'	1517	835	
20"	60'	2882	1546	
20"	75'	3467	1854	20.37
20"	90'	4052	2159	
24"	25'	1590	896	
24"	45'	2430	1334	
24"	70'	3480	1878	
24"	100'	4740	2532	21.78
24"	120'	5580	2967	
24"	150'	6840	3621	
30"	50'	2911	1617	
30"	70'	3871	2112	24.75
30"	90'	4831	2607	
36"	25'	1818	1118	
36"	45'	2858	1677	
36"	60'	3638	2096	27.95
36"	100'	5718	3214	

BONDED® QUALITY BUILT BUCKET ELEVATORS

RIGID THRUOUT - MINIMUM VIBRATION AND NOISE

ENCLOSED ELEVATOR

Open or Enclosed, Vertical or Inclined Bucket Elevators with Continuous or Spaced Buckets mounted on Chain or Belting. Bonded's 19 standard models are designed for low cost, high capacity elevating of practically all bulk materials. Open and other types priced on request. There is a style of bucket for virtually every material or condition: wet or dry, lumpy or fine, granular, slivery, or pellet shapes, hot or chemically active.

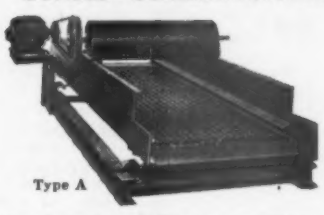
Prices listed at right are for Vertical Enclosed Elevators. Standard Elevators with Chain mounted buckets use #477 or #C102B combination chain. 4, 5 and 6 ply, 32 oz. or 35 oz. duck belt is used on Belt mounted Bucket Elevators.

Bonded Bucket Elevators are Jig Built to insure easy Job-Site Installation.

Model No.	Bucket Size Inches	First 20' (Discharge Ht.)	Add or Deduct Per Ft.
Style "A" Spaced Malleable Buckets on Chain			
C53A	5x3 1/2	$1071.50	$20.25
C64A	6x4	1088.50	21.00
C85A	8x5	1235.00	25.50
C106A	10x6	1281.00	27.50
C127A	12x7	1510.00	31.25
C148A	14x8	1673.50	36.00
Style "A" Spaced Malleable Buckets On Belt			
B53A	5x3 1/2	$1099.00	$20.50
B64A	6x4	1116.50	21.25
B85A	8x5	1311.50	27.25
B106A	10x6	1692.50	33.00
B127A	12x7	1854.50	37.25
Style "E" Continuous Steel Buckets On Chain			
C85E	8x5x 7 3/4	$1397.00	$31.25
C126E	12x6x11 3/4	1599.00	34.25
C108E	10x8x11 5/8	1604.00	34.75
C128E	12x8x11 5/8	1624.00	35.50
C148E	14x8x11 5/8	1710.00	36.75
Style "E" Continuous Steel Buckets On Belt			
B85E	8x5x 7 3/4	$1727.50	$34.50
B116E	11x6x 8 3/4	1839.50	38.75
B128E	12x8x11 5/8	2013.00	43.50

A complete line of parts and accessories available to build your own Bucket Elevators. Continuous Steel, Salem Steel and Malleable Iron Buckets available in a wide variety of sizes, shapes, gauges and styles at low prices. **WRITE FOR BULLETIN #1203 AND PRICES DESCRIBING COMPLETE LINE OF BUCKET ELEVATORS AND BUCKETS.**

BONDED® GENERAL DUTY AND HEAVY DUTY VIBRATING SCREENS



Type A

Type B

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2' x 4' to 3' x 8'. **WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1086.**

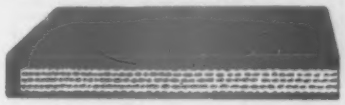
PRICED FROM $443

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft: 3' x 6' to 5' x 14'. 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST**

PRICED FROM $1620.

TESTED CONVEYOR BELTING*

We pay freight on 200 pounds or over plus an additional 10% savings from sale price for full rolls 500 to 650 feet.



Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.

Heavy Duty 4-ply, 28-oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price	Sale Price
14"	4	$3.63 ft.	$2.83 ft.
16"	4	4.08 ft.	2.97 ft.
18"	4	4.51 ft.	3.29 ft.
20"	4	4.97 ft.	3.80 ft.
24"	4	5.85 ft.	4.26 ft.
30"	4	7.18 ft.	5.21 ft.
36"	4	8.51 ft.	6.18 ft.

Major Bee Brand: 16# to 19# Average Friction Pull, 2400# to 3000# Average Cover Tensile. Skim coat between plies.

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, 1/16" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

Width	Ply	List Price	Sale Price
14"	4	$ 4.31 ft.	$3.06 ft.
16"	4	4.85 ft.	3.46 ft.
18"	4	5.39 ft.	3.83 ft.
20"	4	5.90 ft.	4.37 ft.
24"	4	6.94 ft.	4.94 ft.
30"	4	8.53 ft.	6.07 ft.
36"	4	10.09 ft.	7.35 ft.
24"	5	8.14 ft.	5.78 ft.

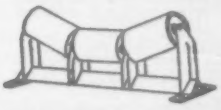
*All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULL. #1234

BONDED® IDLERS AND RETURN ROLLS

SAVE 25% AND MORE



3-roll, 5" diameter Troughing Idlers for:			
14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:			
14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213**

128 Bellevue — **Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders** — **COLUMBUS 7, OHIO**

SPECIALS

2 Model 56-S two yard Koehring tilting mixers
C-R 55x30 double roll crushers; 200 HP elec. Elec.
Symons 5½' cone crusher with 200 HP elec. motor
Traylor 56" x 72" sectional jaw crusher
Truss belt conveyors complete various lengths 24"-30"-40"-48"

CONCRETE MIXERS

2 Jaeger MDL. 168A. Port. Rubber tired.
Hanscome Model 84S, 3 yd. tilting type
Smith 422, 4 yd. tilting type
Koehring 56S 2 yd non tilting type

TRUCKS—TRANSIT MIXERS

15 Ford F8-6 yd. end dump. Excel. Reinforced, 1955
10 Mack LR85W 22 ton rear dump trucks Cummins
6 Euclid 36 TD end dumps 300 HP Cummins Diesel
10 Euclid 28 FD rear dumps 15 ton cap. Cummins
13 Euclids rear dump 12 FD 15 ton; 7 Euclid bottom dump 42 RDT 18 ton
4 Jaeger Transit Mixers 5½ yd. Hi-Dis. New 1957
3 Jaeger 5½ yd. Hi-Dis. Autocar.
2 International VF 192 Transit Mixers high dump six yards Westinghouse. New 1957.

CRUSHERS—KILNS—DRYERS

JAW: Acme 10x20, 15x36, 14x36, 14x22, 16x42, 16x32, 18x32, 25x40. Eagle 10x16, 20x36. Diamond 24x36". Cedar Rapids 10x20, 15x26, 20x36, 25x40. Farrell 10x20, 18x30, 14x36, 18x36, 36x48. Buchanan Type C 30x42, 36x42. Traylor 18x36, 24x36. Allis-Chalmers 30x15. Good Roads 10x20. Telsmith 16x32. Universal 13x24.
GYRATORY: Al-Chal 6, 7½, 8, 9, 10, 12, 16, 18, 20". Telsmith TT 4', 5' Gyrospheres
25B Kennedy Van Saun 12, 37½, 38, 49½"
ROLL: Cedar Rapids 40x30, Pioneer 40x32, 30x18, 54x24 triple roll; Telsmith 24x16. Universal 13x15
HAMMERMILL: Jeffrey Type B8 24x20, Type B 30x24, 36x36, 36x42, Eagle 24x24, Stedman 24x30, 36", 42". Cedar-Rapids 50-50, 30x25, 36x42.
BALL MILL: Hardinge conical 10'x48", 8'x48". 8'x36", complete, motors, Traylor 7'x35'.
TUBE MILLS: Smidth 6'6"x21', 5½x20'.
ROD MILL: Marcy 3'x8' center discharge, 8'x8', Jackson & Church 4'x10'
AUTOCLAVES: J&C 6'6"x38' Quick Acting; 6'x30'
CONE: Symons 2', 4¼' standard head coarse bowl
KILNS: 4'x42', 5'x30', 6'x50'6", 6'4"x45', 11'x155' Vulcan 9x100, 10'6"x103', 8'x124', 6'x90', 6'x72'.
DRYERS: 6'x60', 6'x72', 5'x24', 4'6"x32', 3'6"x20', 6'x30', 5'x25', 6'x24', 4'x40'.
COMPEB MILLS: A-C 7'x24', Patterson 7x18.
FEEDERS: Symstron F55 48x72", 48x60", Jeffrey 36x72". Telsmith 26"x14', Universal 30"x82'.

CRUSHING—WASHING—CLASSIFIER

Pioneer 36 Port. Crushing Plant, 10"x18" Model UD-2641H Diesel engine. New 1955.
Pioneer Port. 10x24 jaw 24x16 roll compl. Diesel
C-R 2540 Prim. Port. Diesel
Pioneer Special 34, 10x24 Jaw 24x16 Roll. Diesel.
C-R Primary Port. 22x36 Jaw. Diesel.
Eagle 36x22" single screwspiral etc.
Lippman Port. WASHMORE washing plant, 36"x 16" sand classifier, 48"x72" revolv. scrubber etc.
Diamond Wee-Cee port. Primary 20"x36" crusher
C-R Port. Prim. 20x36" Diesel B. B.
Eagle BMC Log Washer 48"x30' GM Diesel
Eagle 24"x25' dbl. screw washer 15 HP motor

CONCRETE PLANTS AND EQUIPMENT

Noble CA 354, 4 compts. Complete Large cap. 350
Johnson 2 agg. bins 50 tons ea.-cement silo 1500 bbls.
Erie-Strayer 120 ton aggr. bin 880 bbl silo ground storage 1300 bbl silo
B-K P3100 3 compt. aggr. Heltzel 450 bbl cement
Erie-Strayer P2 3 compt. 195 tons aggr. bin; cement silo 675 bbls. cement interlocking
Erie Strayer port. New 1955, 40 yds. per hr. 600 bbl. cement silo
Johnson 400 yd 5 aggr. 1500 bbls. cement batch 5000 bbl. silo 3-2 yd mixers
Johnson automatic batch 10,000 bbls. cement storage 3-2 yd mixers; screening equipment.
Johnson TY 238 2 compt. agg. w/TY1320 cement unit
Erie—Strayer 2, 50 T. compts. 850 bbls. cement 750 bbl. silo.
Johnson TY-227 70 cu. yd. 105 ton 3 compt. aggr. bin TY168 batcher.
Blaw-Knox BCPC 600 bbl cement silo
Blaw-Knox BCPC 200 bbl cement bin
B-K 5 Comp. 200 yd. ag. bin, cement silo 3000 bbls., 2 Koehring 56-S mixers.

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Morris 6" Diesel on 14'x36' hull
Ga. Iron Works 8" suc. 6" disc. Diesel New 1957. 10" Portable Diesel powered. Complete.
Amaco 12" suc. 10" Dis. Hull 24'x50' Diesel-Elec.
Ellicott 8" with cutter. Diesel Hull 48'x18'x3'6"
8" Hydraulic Diesel. On 32'x8' steel pontoons
6" portable Diesel complete with cutters, etc.

SCREENS

Tyler-Hummer 4'x10' 2 Deck
New Symons 3'x12' 3 HP. Elec. Motor.
Pioneer 5'x12' 3 deck spring suspension
Cedar Rapids 4'x12' dbl. deck 25 H.P. elec. motor
Pioneer 5'x12' 2 deck 30 HP elec. motor
C-R 4'x14' 2 deck 25 HP motor

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2½ Yd. Manitowoc #3900 Crane-Dragline. New 1955. 100' Boom.
1½ Yd. Manitowoc #2000B Crane-Backhoe. New 1956.
100 Ton EMD Diesel Elec. Loco. New 1947.
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50 Ton Amer. Stiffleg Derrick & Hoist.
6 Yd. Bucyrus-Erie Elec. Shovel. New 1955.
90 HP Lidgerwood 2D Diesel Hoist.

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1—Insley "K-12" ½ yd. Trench Hoe, Reconditioned.
1—Insley "K-12" ½ yd. Dragline.
1—General ¾ yd. Dragline.
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5—Bantam "M-49's" ¾ yd. Hoes or Draglines mounted GMC 6x6's.
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1—Lorain USED Shovel Attachment—Cheap.

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Smith 5 Yd. Mixer, large water tank, Continental power, on White 2264, 10.00 x 20 tires, big axles, rebuilt, cleaned, blasted, painted.
Smith 4½ yd. Mixer, small water tank, Continental power, open end; on International LF-192, in good shape.
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Dixie Port. Pulverizing Plant, 3x8 Feeder, 3x8 Cedarapids screen, 3036 mill, 30" under-discharge conveyor, "GM 671" diesel power unit. 6 years old. Overhauled.
Seco 4 x 14'0" 2-Deck Screen. Excellent condition.
Gruendler Used Portable Pulverizer Plant, w/-3x8 Apron Feeder, Gruendler 3X8 Mill, 30" under-Discharge conveyor, 3 axles, 1957 model. Also with Onan 35 KW Generator set on 2 axles. This is a producer and is priced "real right".
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Rogers 20-Ton Low Boy Trailer, Tandem Axle.
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3—Link-Belt NP-135 Vibrating Screens
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6'x25' Louisville Rotary Dryer
6'x50' Louisville Rotary Dryer
6'x60'x½" Vulcan Rotary Kilns
7'x50' Ruggles Cole Rotary Dryer
8'x60'x½" Rotary Kiln
8'8"x70'x½" Direct, Indirect Dryers
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15"x8" to 24"x18" Jeffrey Hammermills
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30"x14" Allis-Chalmers 2-Roll Crusher
Size R322 Allis-Chalmers Crusher
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WHIRLEY CRANE: 90' boom, 25 ton capacity, 440 volt.
SHOVELS: Diesel Electric, 2 yd. to 8 yd. capacity. All modern.
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HAMMER MILL: 350 tons per hour, 6 to 10" material down to 1¼" product.
HARDINGE CONICAL BALL MILLS: 8 x 36 and 8 x 48 complete with 2200 volt motors.
BELT CONVEYOR: 42" x 850 ft. complete with all mechanical and electrical parts, with or without belt.
BUCKET: Williams 1¼ yd. clam shell, material handling.
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1—315 Cu. Ft. Worthington Air Compressor—Gasoline Driven—Mounted on Rubber. Machine in good condition.
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1—25 H.P. 3 phase motor.
2—7½ H.P. Single Phase motors in A-1 Condition
1—5 H.P. Single Phase Motor in A-1 Condition
1—40 foot 24" conveyor. Made by Columbus Conveyor Co. of Columbus Ohio and is complete with belt.
1—TL 20 Lorain Crane new in 1953 powered by Cat D315 engine—30 foot boom together with 2 extra 10' sections for boom—Tagline winder—2 sheave hook block—cable on both drums. This machine in A-1 condition.

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¾ Yard Trojan Model LC-100 front end loader with ¾ yd. 80" bucket

15 ton trailer & tractor	12½ ton Bay City trailer	Lima 34 Paymaster backhoe
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200 DTM 55-24 Hopto	Willard 3 cy mixer on Ford truck	Hopto 360 on GMC truck
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4—Allis-Chalmers 5' x 22' ball-tube mills, 150 HP motors. VERY LOW PRICE.

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11' x 155' Traylor Kiln, ¾", Shell.
9' x 100' Kiln, Vulcan, ⅝" shell.
8' x 125' Kiln—⅝" shell
8' x 115' Kiln—½" shell, 2 tires.
7'6" x 100' Kiln, ½" shell
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8' dia. x 70' L, Ruggles Coles, Double. Shell,
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BALL, TRAYLOR 8' x 11', 300 HP
CONICAL BALL, Hardinge 4' x 16"
COMPEB, Allis Ch., 7' x 24', 450 HP
BALL-TUBE, Allis 5' x 22', 150 HP
ROD, Kennedy 4' x 8', 50 HP, EPD
BALL, Allis 6' x 15', 150 HP
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MISCELLANEOUS

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1—Sauerman 5 cu yd rapid shifting scraper hoist with 330 hp GM Diesel engine and towers
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1—Telsmith 36S Gyrosphere
1—Telsmith 5'x12' Triple deck Vibroking screen with spray bars
3—S-45 Butler single compartment bins
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All motors, starters, switches and wiring included.

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300 HP 2 drum, 500 HP sgl drum **HOISTS**
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WE NEED: 24, 30 or 36" Screw Washers, also Log Washers, Scalping Tanks, Sturtevant Ring Roll & Raymond or Williams Roller Mills. 2036, 3436, 3042 & larger Jaw & 4022 RB Roll Crushers. 6'x36" Hardinge Ball Mills 200 HP d/d Hoist, 4 or 5'x16' Vib. Screens, 18" & 24" Conveyors 150' or longer.
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One used Bucyrus Erie 8-11 yd. Scraper Model S-90, Serial No. 48949; and one LeTourneau Power Control Unit.

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1—5' x 12' three deck Model VCG Gyroset enclosed vibrating screen.
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25½ Kennedy Gyratory Rebuilt
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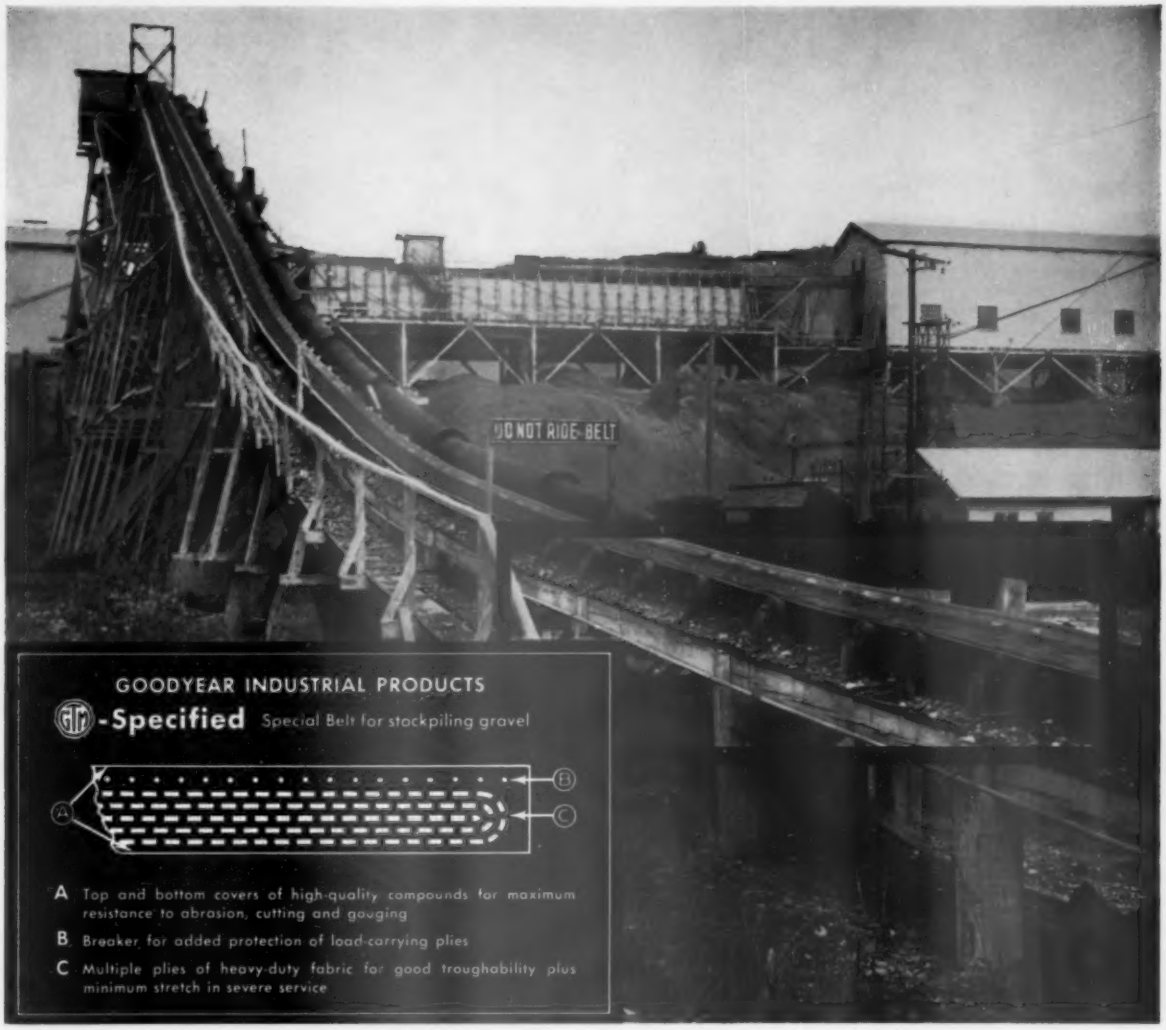
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